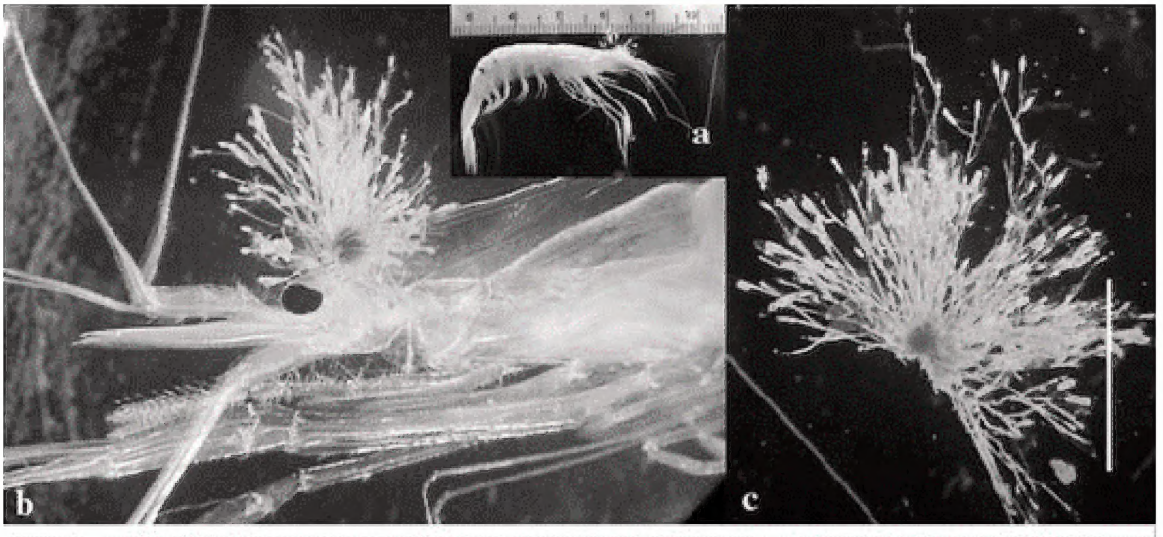
SOUTHERN CALIFORNIA ASSOCIATION OF MARINE INVERTEBRATE TAXONOMISTS

May–August 2023 SCAMIT Newsletter Vol. 42 No. 1-2



Pasiphaea pacifica Rathbun 1902, with a hydroid toupé (from Widmer et al 2009)

This Issue

1 MAY 2023 POLYCHAETE PROVISIONALS & TOOLBOX REVIEW, PART IV, ZOOM 2
12 JUNE 2023, DISCO IDS, NHMLAC 3
JULY/AUGUST 2023 – NO MEETINGS DUE TO BIGHT '23 4
ARTHROPOD PERSONALS CONTINUED 4
NEP OVULIDS 4
SCAMIT OFFICERS 5

The SCAMIT newsletter is not deemed to be a valid publication for formal taxonomic purposes

Publication Date: August 2024

1 MAY 2023 POLYCHAETE PROVISIONALS & TOOLBOX REVIEW, PART IV, ZOOM

Attendance: Brent Haggin, LACSD; Ricardo Martinez-Lara, Veronica Rodriquez-Villanueva, Maiko Kasuya, Adam Webb, CSD; Leslie Harris, NHMLAC; Erin Oderlin, Greg Lyon, Jennifer Smolenski, Danielle Ayala, CLAEMD; Ernie Ruckman, Rob Gamber, OCSD; Erica Keppel, Smithsonian; Kelvin Barwick, DCE; Chip Barrett, EcoAnalyst; Tom Biksey, Retired – Formerly of Don Reish Lab, CSULB.

UPCOMING MEETINGS

Visit the SCAMIT website at: www.scamit.org for the most current meetings announcements.

Kelvin continued his review of the polychaete toolbox files that can be found on https://www.SCAMIT.org. This meeting completed the review of toolbox files and covered the families Pectinariidae, Terebellidae, Trichobranchidae, Capitellidae, Orbiniidae, Paraonidae, Opheliidae, Scalibregmatidae, Travisiidae, Maldanidae, and Cossuridae. Leslie Harris recommended that the ID sheets for *Pectinaria granulata* (now *Cistenides granulata* (Linnaeus, 1767)) be removed from the toolbox as it is not found locally. The voucher sheet for *Lanice conchilega* (Pallas, 1776) will be updated to *Lanice* sp A SCAMIT, 2023 § as *L. conchilega* has had its range restricted to the sandflats of Europe.

A brief discussion on local *Pista* provisional species was had.

- It was decided that *Pista* sp beta Lovell, 2006 § should still be considered a valid local provisional species. It has a unique stain pattern and is from shallow water.
- *Pista wui* was described from Vancouver Island, British Columbia, Canada, and it is likely that true *Pista wui* is not found locally. The local species referred to as *Pista wui* is sampled in deeper water stations.
- *Pista* sp E Harris, 2013 § is also still a valid local provisional species and is part of the local *Pista brevibranchiata* complex.

Brent will work on getting some image sheets for these species on to the SCAMIT provisional species website.

Numerous other voucher and ID sheets will be combined into single files to help reduce the toolbox clutter.

Leslie provided a URL for NMBAQC.org. This website is for the NE Atlantic Marine Biological Analytical Quality Control scheme and the organization provides a similar role as SCAMIT in the British Isles. The website has links to many taxonomic keys created by the group. While the keys are targeted for the British fauna, the keys and site also contain valuable morphological information on the families.

https://www.nmbaqcs.org/scheme-components/invertebrates/literature-and-taxonomic-keys/

12 JUNE 2023, DISCO IDs, NHMLAC

Attendance: Brent Haggin, Norbert Lee, LACSD; Leslie Harris, NHMLAC; Joanne Linnenbrink, Nicholas Galliani, CLAEMD; Dean Pasko, Tony Phillips, Kelvin Barwick, DCE.

A reminder was made to those in attendance that there will not be a meeting in July or August due to the Bight '23 field season. The next meeting will be in September and will cover the polychaete family Capitellidae, hosted by Brent Haggin. Brent will attempt to host a hybrid meeting at the LACSD facility.

The Discovery Initiative for the Southern California Ocean (DISCO) is a research initiative of the Natural History Museum of Los Angeles County. Its aim is to greatly enhance the ability to discover and document biodiversity in the marine environment by applying modern genetic technology (https://research.nhm.org/disco/). The Los Angeles Urban Ocean Expedition was a two-week long collection expedition focused on the Palos Verdes peninsula and the Ports of Los Angeles and Long Beach. The expedition was conducted between August 19 and September 2, 2019, with initial sorting and identification of live organisms conducted at AltaSea at the Port of Los Angeles. Taxonomists from across the United States, including many SCAMIT members from local agencies, participated in the initial collection and taxonomic efforts. This was a very enjoyable experience, as attempting to identify a worm that not only still has pigment, but was trying to escape the forceps, is far more entertaining than the stiff, colorless versions we normally get to encounter.

Thank you to SCAMIT members who were able to assist in the initial taxonomic efforts: Cody Larsen, Greg Lyon, Erin Oderlin, Jennifer Smolenski (CLAEMD); Tony Phillips (DCE); Christine Boren, Don Cadien, Bill Furlong, Brent Haggin, Norbert Lee, Bill Power (LACSD); Leslie Harris, Austin Hendy, Kathy Omura, Regina Wetzer (NHMLAC); Kimo Morris (Santa Ana College); Marie Nydam (Soka University), Tom Turner (UCSB).

On June 12, 2023, after almost four years of postponements due to COVID, members of SCAMIT were finally able to descend upon the Natural History Museum of Los Angeles County to put IDs to some of the organisms collected as part of the DISCO project. Brent, Norbert and Nicholas joined Leslie to look at Polychaetes while Joanne, Tony, Dean and Kelvin joined Regina to look at Molluscs and Arthropods.

Brent and Norbert reviewed 22 individuals, with 11 species from 6 locations. Three of the individuals were either juvenile or an anterior fragment and were identified only to the genus, *Notomastus* sp., and 2 individuals were determined to be a new provisional species and given the name *Notomastus* sp LA3 Haggin, 2023 § (Capitellidae). Details of this provisional species are provided during the September 2023 polychaete meeting on the Family Capitellidae. Other species identified were *Phyllochaetopterus prolifica* Potts, 1914 (Chaetopteridae); *Euphrosine aurantiaca* Johnson, 1897 {4 individuals} (Euphrosinidae); *Poecilochaetus martini* Brantley, 2009 {4 individuals} (Poecilochaetidae); *Harmothoe* sp C Harris, 2018 § {2 individuals} (Polynoidae); *Dipolydora bidentata* (Zachs, 1933) and *Spiophanes duplex* (Chamberlin, 1919) (Spionidae); *Polycirrus* sp OC1 Phillips & Lovell, 1999 § and *Polycirrus* sp A SCAMIT, 1995 § (Terebellidae).

An individual of *Goniada* sp A SCAMIT, 2023 § was identified from the Port of Los Angeles that lacked the distinctive pigment pattern described in the voucher sheet. The holotype of *Goniada acicula* Hartman, 1940 from Angel de la Guardia Island, Mexico was also reviewed. Both

Goniada acicula and *Goniada* sp A lack capillary notochaetae in the posterior notopodia but it was confirmed that *Goniada acicula* has two prechaetal lobes on chaetiger 5 while *Goniada* sp A only has one prechaetal lobe on chaetiger 5.

11 individuals that matched the description of *Streblospio benedicti* Webster, 1879 from Coos Bay, Oregon were reviewed as well. The individuals had a dorsal ridge on chaetiger 2 and 1 pair of branchiae. This species was originally described from the Atlantic Ocean near New Jersey but WoRMS shows it as being an introduced alien species along the U.S. west coast from Canada to Mexico.

Dean put IDs to 5 species of arthropods across 22 individuals. His IDs included *Neotrypaea gigas* (Dana, 1852) (Callianassidae); *Ianiropsis tridens* Menzies, 1952 {15 individuals} (Janiridae); *Pontogeneia rostrata* Gurjanova, 1938 {2 individuals} (Pontogeneidae); *Exosphaeroma inornata* Dow, 1958 (Sphaeromatidae); and *Joeropsis dubia paucispinis* Menzies, 1951 {2 individuals} (Joeropsididae).

After the IDs were concluded, Dean Pentcheff gave us a tour of the collections room and showed us the museum's Label Digitization project. This will allow for easy searching of the museum's collections when complete.

JULY/AUGUST 2023 – NO MEETINGS DUE TO BIGHT '23

ARTHROPOD PERSONALS CONTINUED

Attached you will find a continuation of Don Cadien's series discussing the wonderful world of arthropods.

NEP OVULIDS

Attached is an in-depth review by our fearless Don Cadien of the North Eastern Pacific Ovulidae.

Please visit the SCAMIT Website at: www.scamit.org

SCAMIT OFFICERS

If you need any other information concerning SCAMIT please feel free to contact any of the officers at their e-mail addresses:

President	Brent Haggin	(562)908-4288 x 5672	bhaggin@lacsd.org
Vice-President	Leslie Harris	(213)763-3234	lharris@nhm.org
Secretary	Megan Lilly	(619)758-2336	mlilly@sandiego.gov
Treasurer	Erin Oderlin	(310)648-5477	erin.oderlin@lacity.org

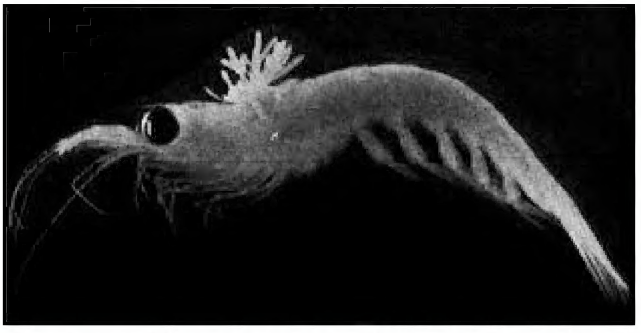
SCAMIT is a 501(c)(3) charity. The newsletter is published every two months and is distributed freely to members in good standing. Membership is $20 for an electronic copy of the newsletter, available via the web site at www.scamit.org, and $35 to receive a printed copy via USPS. Institutional membership, which includes a mailed printed copy, is $65. All correspondences can be sent to the Secretary at the email address above or to:

SCAMIT
PO Box 50162
Long Beach, CA 90815

Arthropod Personals-Seeking companion?

Part 2 – 'That toupé is ALIVE!' -dbcadien, WWRF, Los Angeles County Sanitation Districts 27Nov23

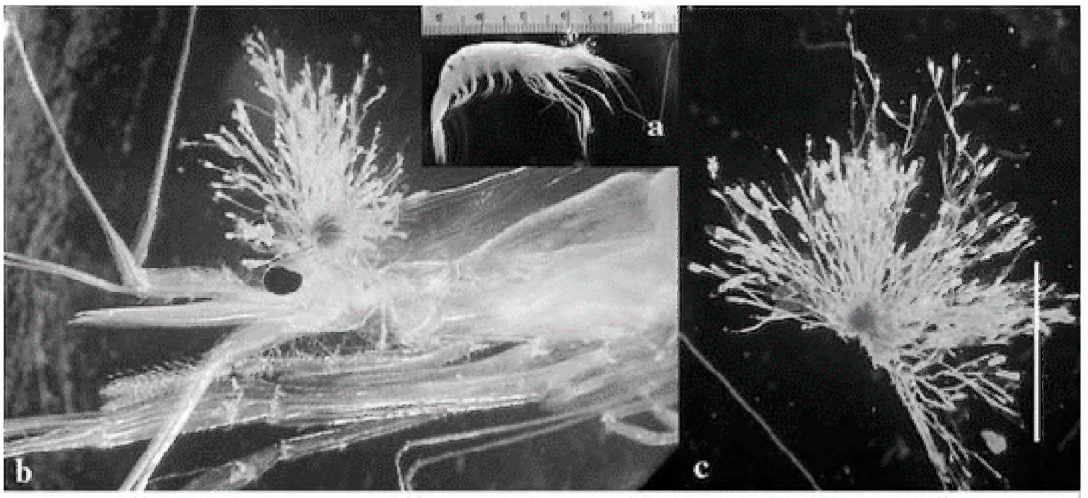
Relationships between different organisms are spread across a spectrum of types, but all deal with symbiosis (aka commensalism): the interrelationship of two different species. These are rarely neutral, infrequently of mutual benefit, and usually detrimental to one of the partners. Such is the relationship between the ectoparasite *Thalassomyces* and the pasiphaeid shrimp *Pasiphaea pacifica* within the SCB. We see them frequently in our trawls, but they don't enter our trawl data as they are holoplanktonic (like salps or medusae) and so not inverts to report in a bottom trawl. Pasiphaeid shrimp are on the SCAMIT listing however, represented by two species *Pasiphaea tarda* and *P. pacifica*. Of the two *tarda* is much less frequently taken, living deeper mostly beyond our sampling range, and bright red. Our typical 'glass shrimp' is *P. pacifica*. Other species also are reported from off California, but at deeper depths than even *P. tarda*. The parasite *Thalassomyces* is found on top of the head of the shrimp, as a tuft of branching structures that is difficult to interpret. It looks like a very bad toupé, or more accurately a Don King fright wig, and is unattractive.



An euphausiid shrimp bearing a different but related parasite (from Hoffman and Yancey 1966)

Thalassomyces is an ellobiopsid parasite (family Ellobiopsidae, subphylum Dinozoa, phylum Myzozoa, kingdom Chromista), which is usually referred to as a parasitic dinoflagellate (see Shields 1994). It is worth noting that members of the other subphylum of Myzozoa, Apicomplexa, include both the organisms causing malaria and *Toxoplasma gondii*, a human brain parasite (Thomas et al 2012) often contracted from cats (see Bachvaroff et al 2014). As such it is neither animal, fungal nor plant, and is not listed in the SCAMIT listing. It is related to other damage and disease causing dinoflagellates, including that causing the 'bitter crab' disease that adversely affects the snow crab fishery in Alaska (see Meyers et al 1987). Little is known of the effects the parasite has on the shrimp, although, as a neuroparasite, it probably affects behavior and survival of the host. There is also some evidence that, like parasitic barnacles, thalassomysids suppress reproduction in the host. WoRMS lists only seven valid taxa of *Thalassomyces* (WoRMS 2023), missing several of the taxa that Shields 1994 lists: https://www.vims.edu/research/units/programs/crustacean/research/parasitic_dinoflagellates/index.php).
As the missing species are neither discussed, nor placed into synonymy, the current WoRMS listing appears incomplete. Based on the listed connections between host and parasite in Shields 1994, the species we see on *P. pacifica* is *T. capillosus* (Fage, 1938). This is the host-parasite pair presented by Butler 1980 in his Shrimps of the Pacific Coast of Canada. He also illustrates the association as being immediately behind and above the rostrum of the host, rather than at the posterior margin of the head as in the euphausiid above. Butler discusses a number of shrimp parasites, but all the rest are other arthropods. Most arthropod personals are seeking other arthropods, keeping it close to home. Ellobiopsid parasites are often host specific, although a number, such as *T. capillosus*, are known to occur on multiple hosts. Where that is the case the hosts are ecologically similar and typically have overlapping bathymetric and geographic ranges. Some species of *Thalassomyces* occur only on mysids or euphausids, but most appear to be found on holopelagic hosts; only a few frequenting benthopelagic forms. Several are known from amphipods, where they occur as brood parasites (Vader and Berge 2004). Their developmental cycle begins with host ingestion of a spore, which then leaves the gut and migrates to the surface of the host. There it transforms into a "fixation organ", a cuticularized anchor for the colony-to-be. This puts out rootlets into the surrounding tissue, through which it derives nutrients. The fixation

organ puts forth trophosomes during ecdysis, which push out through the soft carapace into the surrounding medium. There they grow and eventually produce gonosomes, which produce spores and complete the cycle.
Just to add some spice to this situation, it appears that not all toupés are the same. At least in Monterey Bay, *P. pacifica* occurs both with *Thalassomyces capillosus* and with the hydroid of *Earleria corachloeae* in the same position on the carapace, and in the same trawl hauls (see Widmer et al 2009). We do not have this hydroid on the SCAMIT list, as



Pasiphaea pacifica with hydroid instead of dinoflagellate on head (from Widmer et al 2009)

it has, as yet, not been reported from our area (nor has any Mitrocomid species). It may occur here, and, as the only known habitat for the hydroid stage of the species is on the heads of pasiphaeid shrimp, we need to keep on the lookout for it in our catches. Fortunately the nature of branching of the hydroid, and its more slender hydrocaulus, separate it from the less branched and thicker trophosomes of *Thalassomyces* if one examines the growth with a loupe in the field.
Can this be just coincidence? The hydroid is almost certainly only a passenger rather than a parasite of the shrimp. Why did it localize in the same position as the parasite? Did it initially settle from the plankton onto the parasitic dinoflagellate trophosome, later overgrowing it and leading to it's demise? Is there something about the structure of the pasiphaeid head that makes it hydrodynamically desirable for larval settlement? Widmer et al (2009) discuss the issue of epibiosis on macrofauna by hydroids, but suggest no concrete rationale or mechanism. Many questions remain unanswered about the relationship between these shrimp and their associates.
Heads have been scratched over thalassomyces before. For many years their placement was in dispute, and it is only in fairly recent history that molecular data has placed them in their current position (Gómez et al 2009). While they have also been considered as relatives of flagellates or fungi, their most frequent placement has been with the dinoflagellates. Most members of the group are biflagellate, as are dinoflagellates. There are, however, the odd species bearing only one which muddies the phylogenetic waters. Strange bedfellows for any arthropod, but involved in numerous parasitic relationships with various members of the phylum: copepods, nebaliaceans, amphipods, euphausids, mysids, crabs and shrimp.

Literature Cited:

Bachvaroff, T. R., S. G. Gornik, G. T. Concepcion, R. F. Waller, G. S. Mendez, J. C. Lippmeier and C. F. Delwiche (2014). "Dinoflagellate phylogeny revisited: using ribosomal proteins to resolve deep branching dinoflagellate clades." Molecular Phylogenetics and Evolution **70**: 314-322.

Butler, T. H. (1980). "Shrimps of the Pacific coast of Canada." Canadian Bulletin of Fisheries and Aquatic Sciences(202): 1-280.

Fage, L. 1938. A propos d'un nouvel Ellobiopsidè *Amallocystis capillosus* n. sp. parasite de *Pasiphaea tarda* Krøyer (Crust. Decap.). Trav. Sta. Zool. Wimereux 13: 287-291.

Gómez, F., P. López-García, A. Nowaczyk and D. Moreira (2009). "The crustacean parasites *Ellobiopsis* Caullery 1910 and *Thalassomyces* Niezabitowski, 1913 form a monophyletic divergent clade within the Alveolata." Systematic Parasitology **74**: 65-74.

Hoffman, E. G. and R. M. Yancey (1966). "Ellobiopsidae of Alaskan coastal waters." Pacific Science **20**: 70-78.
Meyers, T. R., T. M. Koeneman, C. Botelho and S. Short (1987). "Bitter crab disease: a fatal dinoflagellate infection and marketing problem for Alaskan Tanner crabs *Chionoecetes bairdi*." Diseases of Aquatic Organisms **3**: 195-216.
Shields, J. D. (1994). "The parasitic dinoflagellates of marine crustaceans." Annual Review of Fish Diseases **4**: 241-271.

Thomas, F., K. D. Lafferty, J. Brodeur, E. Elguero, M. Gauthier-Clerc and D. Missé (2012). "Incidence of adult brain cancers is higher in countries where the protozoan parasite *Toxoplasma gondii* is common." Biology Letters **8**: 101-103.
Vader, W. and J. Berge (2004). "First record of the ellobiopsid parasite *Thalassomyces marsupii* Kane, 1965, in a stegocephalid host, with a review of previous records." Biofar Proceedings: 167-174.
Widmer, C. L., G. Cailliet and J. Geller (2010). "The life cycle of *Earleria corachloeae* n. sp. (Cnidaria: Hydrozoa) with epibiotic hydroids on mid-water shrimp." Marine Biology **157**(1): 49-58.
WoRMS Editorial Board (2023). World Register of Marine Species. Available from https://www.marinespecies.org at VLIZ. Accessed 2023-11-27. doi:10.14284/170

A status review of the North Eastern Pacific Ovulidae for POTW Biologists
dbcadien, WWRF Marine Biology Lab, 22Mar24

Introduction

There is continuing uncertainty as to the species of ovulids that we take in our monitoring. In order to facilitate a reset and assist members in reaching a conclusion regarding their own material, and the collective need, a review of current nomenclature seems in order. Perhaps we can curtail the field identification of these animals as Ovulidae unidentified or *Simnia* sp, and begin to generate more precise data.

SCAMIT currently has no provisionals in this family reported, although there are four species listed in Ed. 14, all described. These include *Phenacovolva bellamaris* in Subfamily Ovulinae, and *Simnia barbarensis, loebbeckeana*, and *vidleri* in Simniinae. This differs in a number of respects from what is reported in WoRMs, but there is confusion and multiple placement of several species there, so the WoRMS position appears to be still in flux.

The family was thoroughly reviewed by Cate 1973, who erected a number of new subfamilies, genera and species, as well as considering all those names proposed for species from our area. Since there is disagreement on just what is and what is not a synonym, and of what, perhaps we should start with a listing of the taxa that have been described from or reported from the SCB in the past:

Southern California Bight records

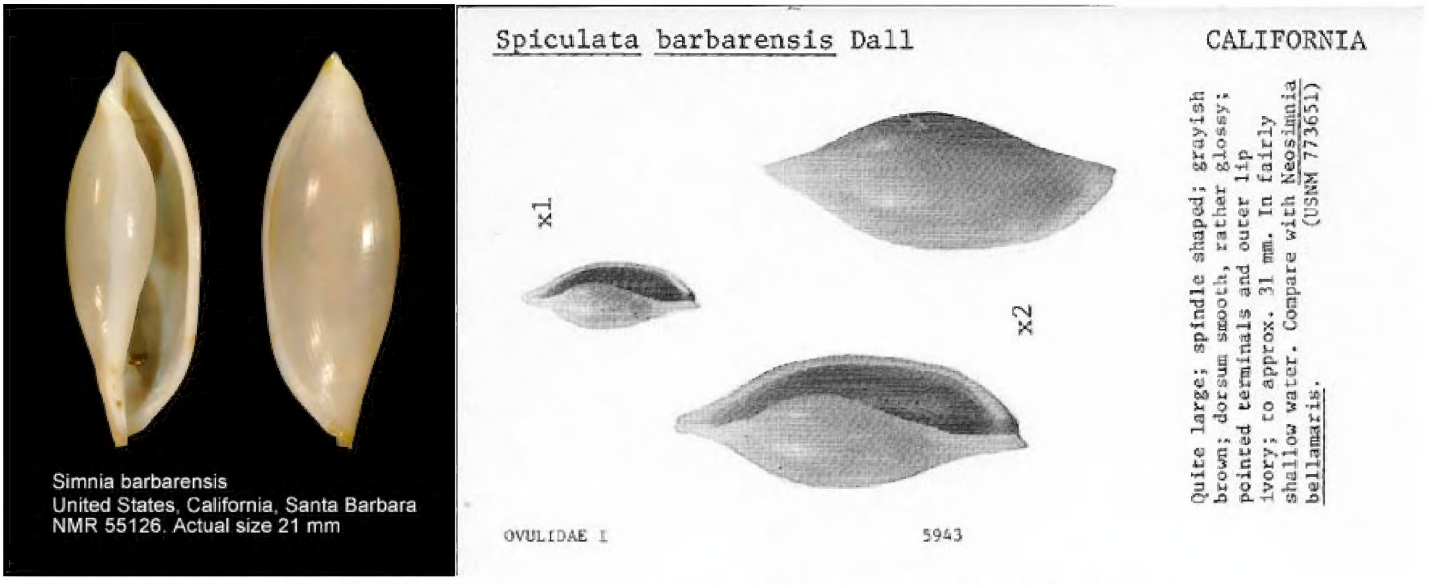
- *aequalis vidleri* – the name used for *Simnia vidleri* (G. B. Sowerby III 1881) in Cate 1973. He separated *a. vidleri* from *a. aequalis* on the basis of geography (outer coast vs Gulf of California) and more acute and orange tinted terminus points in *a. aequalis.*
- *arcuata* (Reeve 1865) – the name under which WoRMs has synonymized *aequalis vidleri*. *Simnia aequalis* is treated as a synonym of *Simnia avena* (G. B. Sowerby I 1833), and no indication by WoRMs as to why the law of priority is suspended to allow Reeve 1865 and G. B. Sowerby I 1833 to be valid while *aequalis* G. B. Sowerby II 1832 is placed in their synonymies. The source of the synonym is not listed on WoRMS for either of the two instances.
- *barbarensis* erected by Dall in Williamson, 1892 as a varietal name of *Ovula deflexa*, a Philippine species which had been recorded from Santa Barbara by Col. Jewett. Considered a valid species since it's establishment, based on a specimen from San Pedro held in the Monks collection. Dall provided a good illustration in association with the description, but the type is now lost. His description is limited, and a case can be made for consideration of this as a nomen inquirendum.
- *bellamaris* – erected by Berry 1946 (Journal of Conchology 22(8))
- *catalinensis* – erected by Berry 1916 an inflated thin species which has been synonymized with *barbarensis* by both Cate 1973 and in WoRMS
- *deflexa barbarensis* – see *barbarensis*
- *loebbeckeana* (Weinkauff 1881) – a narrower, heavier species than *barbarensis* with the anterior and posterior slopes concave rather than convex above and below the median inflation
- *vidleri tyrienthina* – a Berry subspecies now regarded as a synonym of *arcuata* as is *vidleri*.

Locally we seem to have four taxa. McLean 1996 reported the same four in his Taxonomic Atlas coverage of the Gastropoda, but with some nomenclatural differences. The four currently listed taxa are discussed below.

Images of *Simnia arcuata* (Reeve 1865) alive, and without animal

-arcuata, which is typically found on red gorgonians in shallow waters. This has a variably colored shell which can range from white to yellowish, orangish, or rose, and usually but not always has yellow termini. The mantle bears simple scattered papillae and a series of blotches and spots in red to black over a cream base. The foot is white with black spotting on its dorsal side. The mantle papillae are surrounded by areolae clear of blotching. While the shell pigmentation is variable, the mantle and foot pigmentation seems consistent, varying only in intensity and slightly in tint. There are iNaturalist photos of what does appear to be this species which are extremely intensely red colored, with larger mantle papillae placed in rows rather than haphazardly, and with both the mantle and foot pigmentation much darker and redder than in the normal condition. A photo of the live mantle pigmentation of *arcuata* is also provided. Just as a measure of how confused the current nomenclature is, the live photo is supposed to be of *S. barbarensis*, but is actually *S. arcuata*, and the shell photo is labeled *S. vidleri* rather than *S. arcuata*.

-barbarensis, which is typically found on pennatulids in shallow to mid-shelf depths. McLean 1996 reports it associated with gorgonians as well as *Ptilosarcus,* but when encountered by local POTWs it is usually associated with virgulariid pennatulids. *S. catalinensis* Berry 1916 has moved from subjective to objective synonym with the designation of the type specimen of *catalinensis* as neotype of *S. barbarensis*, to replace the lost Monks type of *barbarensis* by Cate (1973). The shell is unpigmented or white, ranging to light greyish tan or yellow, although Keep (1904) refers to the species as the Pink Egg-shell, indicating at least some specimens are pink.

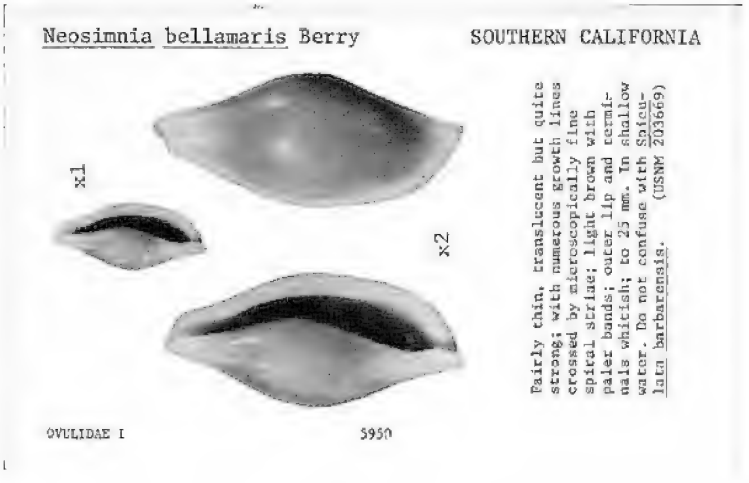

Simnia barbarensis
United States, California, Santa Barbara
NMR 55126. Actual size 21 mm
Spiculata barbarensis Dall
CALIFORNIA
x1
x2
Quite large; spindle shaped; grayish brown; dorsum smooth, rather glossy; pointed terminals and outer lip ivory; to approx. 31 mm. In fairly shallow water. Compare with Neosimnia bellamaris. (USNM 773651)
OVULIDAE I
5943
Photos of *Simnia barbarensis* from WoRMS, and the Kaicher shell catalogue

Simnia barbarensis on *Acanthoptilum gracile* (from Main 1980) and a retracted OCSD specimen (T. Phillips)

The masters thesis by Main (1980) provided information on *Simnia barbarensis* not found elsewhere. He recorded it feeding on *Acanthoptilum gracile*. This association seems well founded since only after feeding had stripped the pennatulid flesh from the hard axis of the colony, did the snail proceed to attach egg capsules to the hard surface. The author also made the interesting observation about *S. avena* (as *aequale*) that they did not actually seem to consume the host tissues, as the host, after feeding passes by the snail, remained intact. He suggested that it, as reported by Patton 1972 for *S. uniplicata* in the Caribbean, feeds on a shed mucous sheath produced by the octocoral rather than its tissues. McLean 1996 reported *S. barbarensis* taken on gorgonians and on *Ptilosarcus gurneyi*, but this requires confirmation. He makes no mention of the species occurring on other pennatulids, such as *Acanthoptilum*, and the source labeling may have been based on a misunderstanding of the host. The photos provided by Main 1980, and the feeding and reproductive behaviors he describes, document the occurrence of *S. barbarensis* on *Acanthoptilum*, casting other anecdotally recorded hosts into doubt. None of the many images of *Ptilosarcus* on the web show an associated ovulid. There are few images of *Acanthoptilum* on the web, and they also fail to document an ovulid associate. The only other images of *S. barbarensis* on *Acanthoptilum* are those in Tuskes and Kelly 2008, based on materials taken not far from those used by Main. They provided additional information on reproduction, the feeding of the snail on the octocoral, and the attempted escape of the sea-pen when under attack. Hertz had earlier (1984) reported finding a single specimen of the species among eel-grass in Mission Bay as a novelty, and so was probably unaware of Main's thesis. During a monitoring effort in Mission Bay I also had seen specimens of this species, and misidentified them as *S. bellamaris*. Four were taken on a single large *Renilla*. I do not know if they were only clinging there, or if they actually sought out the *Renilla*, but I noted no other pennatulids in the vicinity. This was in an area of dense eel-grass growth. One of the more interesting observations made by Tuskes and Kelly was that there was slight sexual dimorphism in *S. barbarensis*, with the males being a bit smaller and somewhat more vividly pigmented. They also were able to observe the actual attack of a snail on a sea-pen, and document the escape response. They provide a series of images showing the snail approaching, then contacting the sea-pen. Shortly after the head of the snail touches the rachis of the sea-pen, the inflated peduncle which holds it in the sediments deflates, allowing currents to begin to carry it away. During their observations the snail had difficulty maintaining hold on the pen, and was usually dislodged.

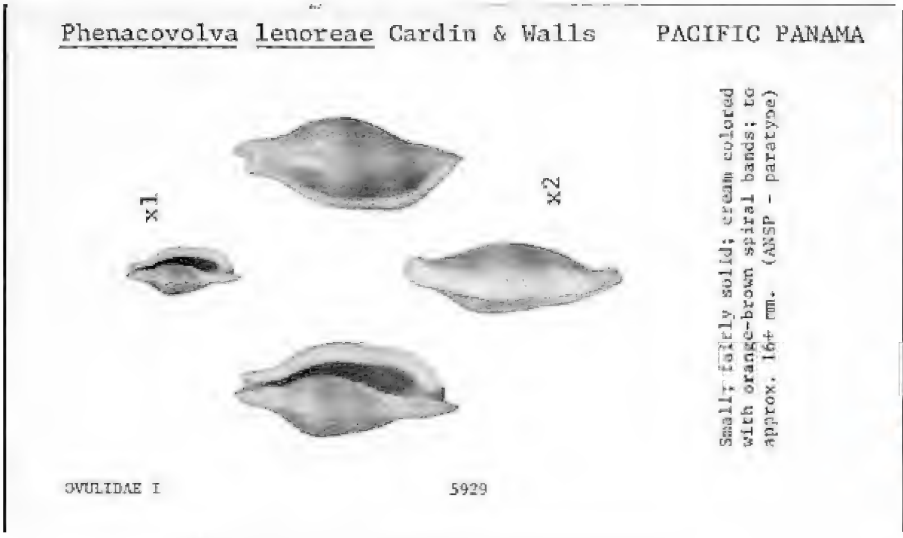
-bellamaris – a species little taken, with few extant specimens. WoRMS is of several minds on this taxon. As *Subsimnia bellamaris*, as it is listed in Cate 1973, WoRMS lists it as a synonym of *Simnia loebbeckeana*. As *Neosimnia bellamaris* (as Berry described it in 1946), it is listed as a synonym of *Phenacovolva lenoreae* of Cardin and Walls 1980. The current SCAMIT list follows this latter placement, although it is difficult to reconcile the structure of *bellamaris* with what is typically found in *Phenacovolva*. While photos of the holotype (Cate 1973 fig 161 and 161a) share the reflexed outer lip

seen in *loebbeckeana*, they differ in several other respects, particularly the degree of central inflation of the shell body whorl. The areas before the termini are also not so clearly concave as in *loebbeckeana*. That synonymy seems inappropriate to me, although the ranges are not discordant (*bellamaris* San Diego area, *loebbeckeana* Monterey to Magdalena Bay, outer Baja California [as redefined in Cate 1973]. I don't believe the synonymy is appropriate based on comparison of figures of the shells of these animals. No information is available on the appearance of the living members of either species as far as I can locate. The issue with *Phenacovolva lenoreae* is more difficult, particularly as I can find no description of that species. WoRMS has *bellamaris* (1946) listed as a synonym of *lenoreae* (1980), a wrenching misapplication of the law of priority in the absence of some explanatory comment (totally lacking on WoRMS) or in available literature. We reversed that obvious issue when listing *Phenacovolva bellamaris* in Ed. 13, with *P. lenoreae* as junior synonym, However, images of both are provided in the Kaicher shell catalogue, and there appear to be differences between the two, particularly in the formation of the anterior terminus. The two also differ in range: *P. lenoreae* being a Pacific Panamic form, while *S. bellamaris* is known only from shelf depths off San Diego. Both share an ill-defined pattern of shell pigmentation (transverse brownish bands over a lighter brown base), but the shell structure is strongly divergent. Berry's *bellamaris* does not seem to belong in *Phenacovolva*, being in the subfamily Simniidae not in the subfamily Ovulinae, where *Phenacovolva* is placed. This reflects what Cate (1973) reported, although not going so far as to erect a new genus for the species (*Subsimnia*), a taxon now viewed as a synonym of *Simnia* in WoRMS. So, as neither the proposed synonym of *bellamaris* with *loebbeckeana* nor that with l*enoreae* appear to be workable, it seems that for now *bellamaris* should remain valid based on shell morphology alone. Should verifiable molecular information become available, that could easily change. More information on *P. lenoreae* recently became available.


Neosimnia bellamaris Berry
SOUTHERN CALIFORNIA
x1
x2
Fairly thin, translucent but quite strong; with numerous growth lines crossed by microscopically fine spiral striae; light brown with paler bands; outer lip and terminals whitish; to 25 mm. In shallow water. Do not confuse with Sulcularia barbarensis. (USNM 203669)
OVULIDAE I
5950

A paper by Jerry Walls, one of the co-authors, was located and digested (Walls 2017). It removes much of the mystery concerning why information was so sparse, and the original description could not be found. First off the name was privately published in a self-produced journal, The Pariah, which Walls was using to describe new cone species as he worked on his world compendium of cones (Walls 1979). The original description is cited below, but I still have been unable to locate the paper to actually read it. Self-publication is not all that rare, especially with mollusks, and can be done within the requirements of the International Code so that names so published are valid and available for taxonomic use. We are familiar locally with Amphipacifica, a journal created and largely filled by E. L. Bousfield to publish large monographs otherwise difficult to get into print, and S. S. Berry's series of Leaflets in Malacology as examples of such valid publication. As I can find no trace of The Pariah anywhere, I don't know for sure if it meets the publication requirements of the Code. The fact that WoRMS lists *P. lenoreae* as a valid taxon suggests that it did, but I remain not fully convinced. Walls (2017) also provided very fine images of *P. lenoreae*, and discussed the situation with *S. bellamaris*, indicating that Lorenz and Fehse (2009) declared *bellamaris* a nomen dubium calling it 'unrecognizable' according to Walls. As Cate had earlier provided very good description and illustration of Berry's species, I'm not sure just why they found it so. The fact that WoRMS carries *bellamaris* as a synonym of two different taxa in two different subfamilies follows in part the action of Dolin and Ledon 2002, who proposed synonymy with *S. loebbeckeana* based on fossil material. The second synonymy, with *P. lenoreae* seems fairly inexplicable: even Walls (2017) comments on the disparity in the type localities for the two, while noting the similarity in pigmentation and patterning. He also noted that

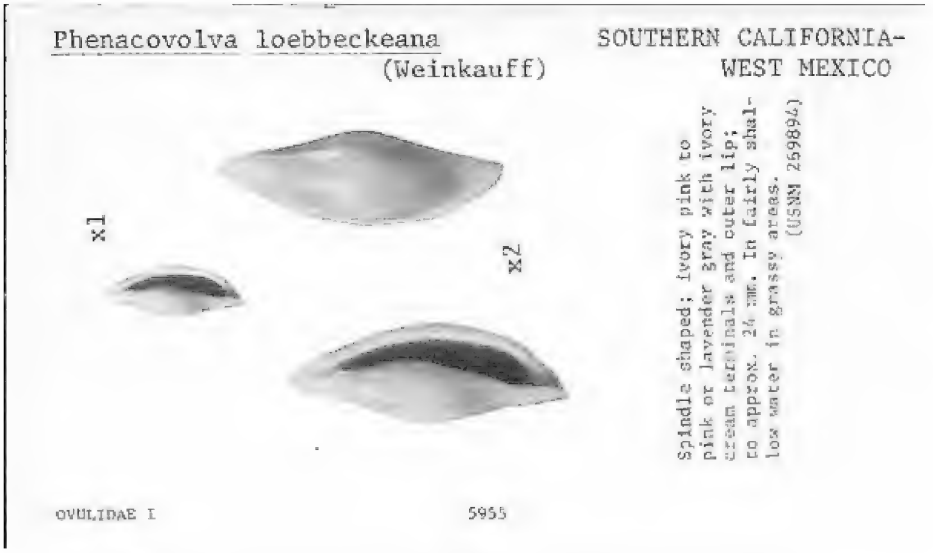
morphological characters distinguishing the many ovulid genera are seldom adequately established, although molecular data clearly place *Phenacovolva* and *Simnia* in differing clades (Schiaparelli et al 2005). While researching this issue it became apparent that the large globose species I thought *S. bellamaris* which I had taken on *Renilla* in Mission Bay was actually the same as Berry's *catalinensis*, now synonymized (since Cate 1973) with *S. barbarensis*.


Phenacovolva lenoreae Cardin & Walls PACIFIC PANAMA
x1
x2
Small, fairly solid; cream colored with orange-brown spiral bands; to approx. 16+ mm. (ANSP - paratype)
OVULIDAE I
5929

Kaicher card of *Phenacovolva lenoreae*

Phenacovolva lenoreae (from Walls 2017)

-loebbeckeana (Weinkauff 1881) – McLean (1996) treated this, along with *barbarensis*, illustrating both in his Taxonomic Atlas volume. Unfortunately, his brief key to them was awful and misleading. The photos however are of value. They show *loebbeckeana* as a smaller, more compact form with a strongly reflexed outer lip, and concave sides leading to the termini. His photo of *barbarensis* shows a larger, thinner, more globose species, with a much thinner outer lip, and no concavity in the lateral profile. While both are wider in the middle of the shell, the taper on *loebbeckeana* towards the termini commences more rapidly and more strongly, leading to a very different overall profile to the shell. The two species overlap in range as reported by McLean, with *loebbeckeana* known from Monterey to Magdalena Bay, Outer Baja California, and *barbarensis* from Ft. Bragg Northern California to Isla Cedros, Baja California.
The shell is described as white or translucent, unpigmented.


Phenacovolva loebbeckeana (Weinkauff)
SOUTHERN CALIFORNIA-WEST MEXICO
x1
x2
Spindle shaped; ivory pink to pink or lavender gray with ivory cream terminals and outer lip; to approx. 24 mm. In fairly shallow water in grassy areas. (USNM 259894)
OVULIDAE I
5955

Kaicher card for *Simnia loebbeckeana* (Weinkauff 1881)

An image listed as *Simnia* cf. *loebbeckeana* on line. This apparently came from the Gulf of California, no images from locally collected material were available. The identify must remain tentative, although the sparse orange spotting on a white ground is clearly unlike that of other species in the region. The host was identified as a gorgonian, but differs from any discussed by Horvath 2019a,b,c

Adjacent Pamamic species

The Panamic component of the EP Ovulidae remains unaddressed. This includes forms not yet recorded from our or adjacent waters, but which could potentially range into them as the climate changes. As summarized by Bertsch and Bibbey (1982) these include (although usually under different generic placements):

Simnia avena (G. B. Sowerby I 1833), with which *Ovulum aequale* G. B. Sowerby I 1832 has been synonymized. Sanchez et al (2016) cite this synonymy as coming from Lorenz and Fehse (2009). No rationale is evident for this reversal of priority, but *avena* does have page priority over *inaequale* in the Conchological Illustrations. Sanchez et al report this species as associated with various *Pacifigorgia*, *Leptogorgia* and *Eugorgia* species in Costa Rica. An MS thesis by Main (1980) illustrated *Simnia aequalis* feeding on *Leptogorgia "rigida"*, but whether that is accurate or not I am not sure. If correctly identified the proper name is *Leptogorgia rigida* Verrill 1864. The live appearance of his animals matches that shown above for the Californian *S. arcuata*: while Main's specimens came from the Gulf of California .

Simnialena rufa (G. B. Sowerby I 1833), listed as the valid name of *Ovulum inflexum* G. B. Sowerby I 1832. This synonym apparently stems from both Cate 1973 and Lorenz and Fehse 2009 (Sanchez et al 2016). It could be based on page priority, as *rufum* occurs the page before *inflexum* in the Conchological Illustrations. However, Lorenz and Fehse do not qualify as first revisers by any stretch of the imagination. There is no mystery about either the publication dates or authorship (Cate treated it as G. B. Sowerby II), such things having been made meticulously clear by Petit 2009. Plenty of reason to be confused though, as the cover page of the Conchological Illustrations lists the authorship as of G. B. Sowerby, Jr.(II) Petit concluded in his examination of the works of all three G. B. Sowerbys, that G. B. I had let G. B. Jr. take the authorship, although he had done the work of description. This ovulid was reported to be associated with *Pacifigorgia* cf. *curta* and *P. cairnsi* in Costa Rica (Sanchez et al 2016). All four of these ovulids were described together as new species, first in 1832 in the Conchological Illustrations and then again in 1833 in the Proceedings of the Committee of Science and correspondence of the Zoological Society of London for 1832. The part in which the ovulids

were included was not published until January 1833, thus the modified date. The descriptions are identical in the two, except those in the Conchological Illustrations are in English, those in the Proceedings in Latin. The choice in WoRMS to embrace the latter date as the date of establishment of the taxon seems inexplicable in the absence of other information. Petit lists all four taxa as of G. B. Sowerby I 1832 in the Conchological Illustrations.

Cyphoma emarginatum (G. B. Sowerby I 1830) - distributed from Ecuador north to near the head of the Gulf of California. Associated with red gorgonians.

Xandarovula hammesi Bertsch and Bibby (1982) known from off Pacific Panama at about 330m, taken by shrimp boats, so without host association.

They also listed several members of the related family Pediculariidae (*Jenneria pustulata*, *Pedicularia californica*, and *Pseudocypraea adamsonii*) as well as several additional species now synonymized with those listed above.

Discussion

Morphological variability in shell and mantle, as well as color variability in both has made the taxonomy of ovulids both messy and contentious. There is a prevailing perception that the group is over-described, partly because of a legacy of attention and description by early workers who utilized characters now viewed as variable as discriminatory. Rosenberg (1992), in an introduction to the group, opined "Almost 400 names have been given to living species of ovulids, but I consider only about 160 to 170 of these to be valid." Many additional names have been proposed since 1990, so this ratio may have shifted. Aside from the variability of the adult appearance, a basic aspect of ovulid biology has been ignored: their reproduction. With but a few exceptions the group has teleplanic larvae capable of broad geographic dispersion (Scheltema 1971). They have been treated as though they were poorly dispersed narrow-range endemics however, and over-described in the process.

As molecular evidence has begun to accumulate, discordance between genome and appearance has proven evident, if not pervasive (see Wu et al 2022, Reijnen et al 2019, Reijnen et al 2017). The entire family is related through predation to octocorals (Nocella et al 2024), and in consequence has adopted characteristics of shape, body texture and color to allow it to be either cryptic (Batesian mimicry) or conspicuous (aposematic) on the host. For most ovulid taxa mimicry is the chosen path, while aposematism is limited to a few taxa having developed chemical anti-feedants produced by glands in their mantle. These strive to be as glaringly obvious on their hosts as possible, promoting a strategy of learned avoidance in predators who sample them, find them distasteful, and spit them out. Such species are otherwise modified to survive such unsuccessful predation, and so are able to pass on their genes to new generations. The most familiar example of this is the genus *Cyphoma*, which have very robust shells for ovulids. Reijnen et al 2017 found, however, that when four highly visible phenotypes of the genus (all viewed as different species) were investigated molecularly, the phenotypes were distributed almost randomly throughout the molecular-based tree. At first sight this would seem to prove that pigmentation and mantle configuration have no relationship to genetics. Keep in mind, however, that this is an aposematic situation in which the snail is under no evolutionary pressure to adopt a particular appearance as long as what it does adopt contrasts strongly with the host. In the much larger proportion of the family pursuing a strategy of Batesian mimicry, there is strong pressure for the snail predator to comply with a particular appearance: that of the host. If there is strong host specificity between the predatory snail and it's prey, coloration is likely to be closely tuned to the variability of the prey itself, as is the morphology of the mantle (Sanchez 2013). This is likely to lead to limited variability in snail morphology. There is evidence for both host specificity and the

Mantle papillae of *Simnia avena* closely mimic zooids of its host *Pacifigorgia* cf. *cairnsi* (Sanchez 2013)

use of a variety of hosts by ovulid species (Reijnen et al 2010, Reijnen 2015), and those that frequent hosts of variable appearance are likely to be more variable themselves in consequence. So the potential reliability of shell and mantle characteristics in the separation of co-occurring ovulids should vary on a case-by-case basis. No generalization of it's applicability or inapplicability seems possible given the competing forces determining the extent of variability ecologically required of a given species. That being said, such characters are among the few available to us, and information on them should be systematically gathered along with additional genetic data.

Recommendations:

1) Accept the synonymy of *S. vidleri* with *S. arcuata* and begin to adopt that name in our data
2) Remove *Phenacovolva bellamaris* and the subfamily Ovulinae from the SCAMIT listing. Its inclusion was based on a misidentification, and no authenticated specimens taken by SCAMIT members are known.
3) Begin to identify trawled specimens of *Simnia* in the field based on the photographic evidence provided here, and make additional efforts to relate ovulid occurrence and host presence and identity. To assist with field identification we should standardize use of a recovery period (in the shade or under refrigeration) where the snails can be allowed to re-expand and reveal their mantle coloration. Once they do, this should be documented photographically to connect the field appearance with any collected vouchers. That should also give more opportunity to fully process the catch, revealing any potential gorgonian or pennatulid hosts it might contain. These should be mentioned, as should a host directly associated with the specimen(s), but potential and observed host relationships should be noted separately in data. Tissue for DNA analysis should also be gathered.

Literature Cited: [those with an asterisk not examined]

Berry, S. S. (1916). " A new *Ovula* from California." The Nautilus **30**(2): 21-22.

Berry, S. S. (1946). "A new Californian *Neosimnia*." Journal of Conchology **22**(8).

Bertsch, H. and L. J. Bibbey (1982). "A new tropical Eastern Pacific Ovulidae (Gastropoda): *Xandarovula hammesi*." The Nautilus **96**(2): 42-45.

Cate, C. N. (1973). "A systematic revision of the recent cypraeid family Ovulidae (Mollusca: Gastropoda)." Veliger **15**(Supplement): 1-116.

*Cordin, C. and J. G. Walls (1980) "A new false cowry from Pacific Panama (Ovulinae, Simniinae). The Pariah 8:1-2.

Dolin, L. and D. Ledon (2002). "Nouveaux taxons et discussion de la systématique des genres correspondants d'Ovulidae (Mollusca, Caenogastropoda) de l'Eocène inférieur de Gan (France)." Geodiversitas **24**(2): 329-347.

Hertz, C. M. (1984). "Finding *Simnia barbarensis* (Dall, 1892) in San Diego." The Festivus **15**(4): 41-43.

Horvath, E. A. (2019a). "A review of gorgonian coral species (Cnidaria, Octocorallia, Alcyonacea) held in the Santa Barbara Museum of Natural History research collection: focus on species from Scleraxonia, Holaxonia, and Calcaxonia - Part I: Introduction, species of Scleraxonia and Holaxonia (Family Acanthogorgiidae)." ZooKeys(860): 1-66.

Horvath, E. A. (2019b). "A review of gorgonian coral species (Cnidaria, Octocorallia, Alcyonacea) held in the Santa Barbara Museum of Natural History research collection: focus on species from Scleraxonia, Holaxonia, Calcaxonia - Part II: species of Holaxonia, families Gorgoniidawe and Plexaurida." ZooKeys(860): 67-182.

Horvath, E. A. (2019c). "A review of gorgonian coral species (Cnidaria, Octocorallia, Alcyonacea) held in the Santa Barbara Museum of Natural History research collection: focus on species from Scleraxonia, Holaxonia, calcaxonia - Part III: Suborder Holaxonia continued, and suborder Calcaxonia." ZooKeys(860): 183-306.

Keep, J. (1904). West American Shells. San Francisco, California, USA, The Whitaker & Ray Company.

*Lorenz, F. and D. Fehse (2009). "The Living Ovulidae: a manual of the families of allied cowries: Ovulidae, Pediculariidae, and Eocypraeidae". ConchBooks, Hackenheim, Germany.

Main, K. L. (1980). The external morphology, anatomy and larval development of *Simnia equalis* and of *Simnia barbarensis* (Gastropoda: Prosobranchia). Biology. Northridge, California, California State University, Northridge. **M. Sc.:** 77pp.

McLean, J. H. (1996). The Prosobranchia. Santa Barbara, California, U.S.A., Santa Barbara Museum of Natural History. 1-159.

Nocella, E., S. S. Zvonareva, G. Fassio, D. Pica, B. Buge, R. Villa, N. Puillandre, M. V. Modica and M. Olivario (2024). "Spicy food for the egg-cowries: the evolution of corallivory in the Ovulidae (Gastropoda: Cypraeoidea)." Frontiers in Marine Science **10**(1323156): 21pp.

Patton, W. K. (1972). "Studies on the animal symbionts of the gorgonian coral, *Leptogorgia virgulata* (Lamarck)." Bulletin of Marine Science **22**(2): 419-431.

Petit, R. E. (2009). "George Brettingham Sowerby, I, II & III: their conchological publications and Molluscan taxa." Zootaxa (2189): 1-218.

Reijnen, B. T. (2015). "Molecular data for *Crenavolva* species (Gastropoda, Ovulidae) reveals the synonymy of *C. chiapponii*." ZooKeys(501): 15-26.

Reijnen, B. T., B. W. Hoeksema and E. Gittenberger (2010). "Host specificity and phylogenetic relationships among Atlantic Ovulidae (Mollusca: Gastropoda)." Contributions to Zoology **79**(2): 69-78.

Reijnen, B. T. and S. E. T. van der Meij (2017). "Coat of many colours - DNA reveals polymorphism of mantle patterns and colouration in Caribbean *Cyphoma* Röding, 1798 (Gastropoda, Ovulidae)." PeerJ **5**(e3018): 20pp.

Reijnen, B. T. and S. E. T. Van der Meij (2019). "Systematics of the subfamily Aclyvolvinae (Caenogastropoda: Ovulidae) based on molecular and morphometric analyses." Journal of Molluscan Studies **85**: 336-347.

Rosenberg, G. C. (1992). "An Introduction to the Ovulidae (Gastropoda: Cypraeacea)." American Conchologist **20**(1): 4-7.

Sánchez, J. A. (2013). "Remarkable specialization in Eastern Pacific sea fan ectoparasites (*Neosimnia*)." Coral Reefs **32**: 891.

Sánchez, J. A., A. P. Fuentes-Pardo, I. M. Alhain, N. E. Ardila-Espitia, J. Cantera-Kintz and M. Forero-Shelton. (2016). "The masquerade game: marine mimicry adaptation between egg-cowries and octocorals." PeerJ **4**(e2051): 18pp.

Scheltema, R. S. (1971). "Larval dispersal as a means of genetic exchange between geographically separated populations of shallow-water benthic marine gastropods." Biological Bulletin **140**: 284-322.

Schiaparelli, S., M. Barucca, E. Olmo, M. Boyer and A. Canapa (2005). "Phylogenetic relationships within Ovulidae (Gastropoda: Cypraeidae) based on molecular data from the 16S rRNA gene." Marine Biology **147**: 414-420.

Sowerby, G. B. I (1832). *The conchological illustrations or, Coloured figures of all the hitherto unfigured recent shells*. London

Sowerby, G. B. I. (1833). Descriptions of new species of shells from the collection formed by Mr. Cuming on the western coast of South America, and among the islands of the southern Pacific Ocean.]. *Proceedings of the Committee of Science and correspondence of the Zoological Society of London.* Part II for 1832: 173–179

Tuskes, P. M. and J. A. Kelly (2008). "Observations and biology of *Neosimnia barbarensis* and its sea pen host in Mission Bay, San Diego, California." The Festivus **40**(10): 117-120.

*Walls, J. G. (1979) "Cone Shells". TFH Publications, Neptune, New Jersey.

Walls, J. G. (2017). "The history of a shell: *Phenacovolva lenoreae*." American Conchologist **45**(1): 8-11.

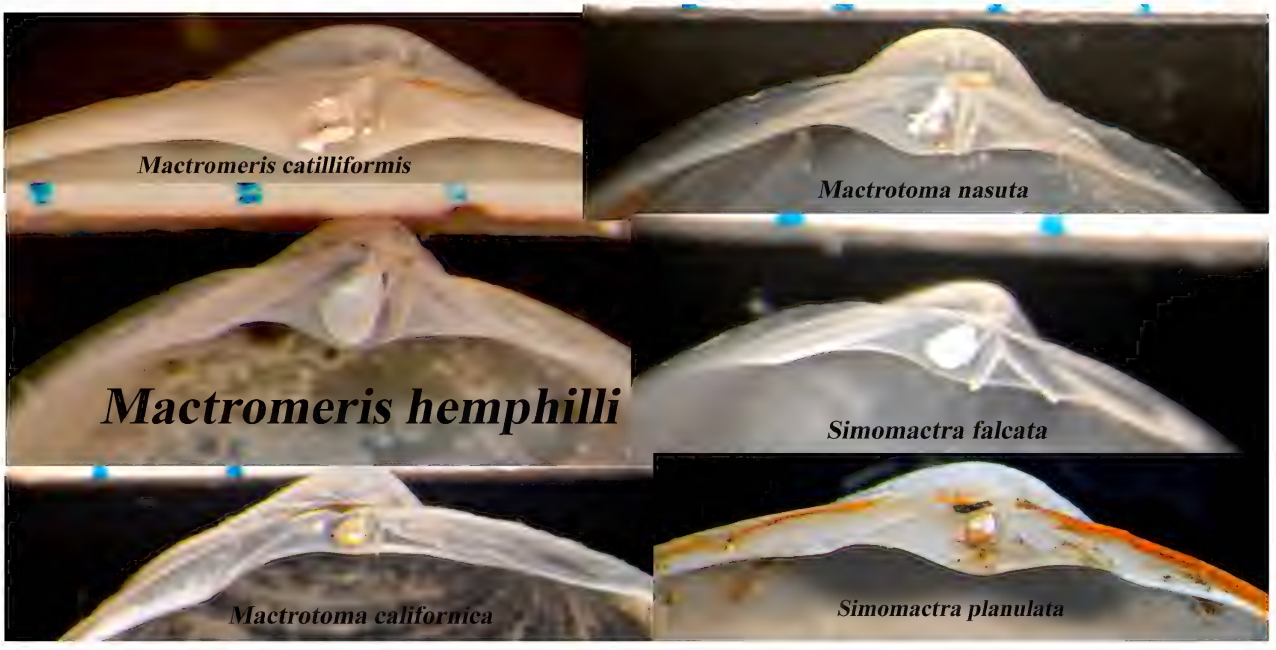
Weinkauff, Heinrich Conrad 1881. Die Gattungen *Cypraea* und *Ovula*. In: Martini & Chemnitz, Systematisches Conchylien Cabinet, 2d

ed., 5(3): 167-215; pits. 44 – 53.
Williamson, M. M. B. (1892). "An annotated list of the shells of San Pedro Bay and vicinity (with a description of two new species by W. H. Dall)." Proceedings of the United States National Museum **15**(898): 179-219.
Wu, Q., B.-P. Xing, M. Lin, G.-C. Chen and C.-G. Wang (2022). "Molecular phylogeny suggests synonymy of *Sandalia bridgesi* Lorenz, 2009 with *S. tritica* (Lamarck, 1810) (Gastropoda, Ovulidae)." ZooKeys(1096): 189-206.

SOUTHERN
CALIFORNIA
ASSOCIATION OF
MARINE
INVERTEBRATE
TAXONOMISTS

Sept–Dec 2023 SCAMIT Newsletter Vol. 42 No. 3-4

Mactridae



Comparison slide of Mactridae spp hinges by T. Phillips

This Issue

11 SEPTEMBER 2023, CAPITELLIDAE, LEAD B. HAGGIN 9
16 OCTOBER 2023, CRUSTACEA, LACSD, LEAD D. PASKO 57
13 NOVEMBER 2023, BIVALVIA PART V, LEAD T. PHILLIPS 2
11 DECEMBER 2023 – SCAMIT ANNUAL ALL-HANDS, ZOOM 4
ARTHROPOD PERSONALS PART 3 BY D. CADIEN 64
LITERATURE CITED 7
SCAMIT OFFICERS 8

The SCAMIT newsletter is not deemed to be a valid publication for formal taxonomic purposes

Publication Date: March 2025

11 SEPTEMBER 2023, CAPITELLIDAE, LEAD B. HAGGIN

The minutes from this meeting were submitted as a summary of Brent's presentation on the Capitellids. For ease of formatting and to retain the work that Brent did to places images in the appropriate spots in his text, the minutes/presentation are attached at the end of the newsletter.

16 OCTOBER 2023, CRUSTACEA, LACSD, LEAD D. PASKO

UPCOMING MEETINGS

Visit the SCAMIT website at: www.scamit.org for the most current meetings announcements.

The minutes of this meeting were compiled by Dean and were extensive and comprehensive. Therefore, similar to the September minutes, they are included as an attachment at the end of the newsletter in order to preserve Dean's formatting for the graphics and image placements.

13 NOVEMBER 2023, BIVALVIA PART V - ORDERS VENERIDA, MYIDA, ANOMALODESMATA, AND GASTROCHAENIDAE, LEAD T. PHILLIPS

Attendance: Paul Valentich-Scott, Retired (SBMNH); Brent Haggin, Wayne Dosset, Amber Von Tungeln, LACSD; Kelvin Barwick, Tony Phillips, DCE; Andy Davenport, Wendy Enright, Megan Lilly, Coulson Lantz, CSD; Gregy Lyon, CLAEMD; Alison Fisher, Heather Peterson CCSF; Dany Burgess WADOE.

Below are a few notes from Tony's presentation but for the full banana go to: SCAMIT Taxonomic Toolbox/Mollusca/Conchifera/Bivalvia/Other Useful Tools

Venerids:
Mactomeris catilliformis (Conrad 1837) – found in San Diego Bay from 5-20 m in sand.

Macoma nasuta (Conrad 1837) – the northern range is listed as Santa Barbara, CA but Tony has seen specimens from further north. To deal with this he has added the moniker "cf" to specimens collected from Avila Beach (San Louis Obispo) and San Francisco.

Simomactra planulata (Conrad 1837) - Tony noted he has found it down to 95 m. Megan stated that she is concerned with the possibility of confusing it with *S. falcata* (Gould 1850) which is the species City of San Diego commonly sees offshore. Separating the species involves looking at the pallial sinus. See Coan et al 2000 for further information.

Tony showed a comparison slide of Mactridae spp hinges and Paul suggested that it be shared in a SCAMIT newsletter. So, it now graces the cover of this issue.

Tony stated that both *Cyathodonta pedroana* Dall 1915 and *Raeta undulata* (Gould 1851) have large commarginal ribs but *Raeta* is pointed at the posterior, whereas *Cyathodonta* is truncate. Paul noted that sculpture changes on *Cyathodonta* and reminded everyone that ultimately the hinges of the genera are very different.

Myidae:
Mya arenaria Linnaeus 1758– Kelvin asked if this species is invasive and Paul confirmed it is.

Platyodon cancellatus (Conrad 1837) – Paul stated this species is common in the Goleta slough.

Sphenia fragilis (H. & A. Adams 1854) - Tony has only seen *S. fragilis* and has never seen *S. luticola* (Valenciennes 1846). The difference between the two species has to do with the chondrophores. We were told to use caution with juv *Hiatella* as they can be smooth and look superficially similar to *Sphenia*. The two can be found together in rip rap samples. A q uick check will reveal that *Hiatella* has an external ligament and *Sphenia* has an internal ligament. Additionally, *Hiatella*, with growth, becomes more inflated than *Sphenia*.

Grippina californica Dall 1912 - Kelvin noted that he has found this species at 181 m which is a depth extension from that listed in Coan et al 2000.

Pholadidae and Xylophagaidae
These Families contain the wood borrers. They are usually shallow but can be found offshore (CSD) if wood is present. Some species bore into sandstone or clay. See Coan et al 2000 for a good graphic outlining the differences among the species.

Gastrochaenidae
These are also borers but their chosen habitat is kelp holdfasts. Tony has never seen a live specimen but rather has only seen them in shell hash.

Cuspidariidae:
Cardiomya lanierli (Strong & Hertlein 1937) – this is a southern species and Tony has only seen one which he suspects came up as larvae during an El Niño event.

Lyonsiidae
Entodesma are smooth and have no ribbing.

Entodesma brevifrons (G. B. Sowerby I 1834) – found nestling in sponges and ascidians. Tony has never collected this species.

Entodesma navicula (A. Adams & Reeve 1850) – has some radial striae and is similar to local *Lyonsia californica* Conrad 1837 in having adherent sand grains, but it is much more inflated ventrally than *L. californica.*

Lyonsia californica– usually with adherent sand grains however it can be smooth as in no adherent material. Radial striae present. When Tony showed his slides of *L. californica* specimens Paul chimed in that he suspects one of the animals pictured might be a southern species pictured in his Panamic book (Coan, 2012). Megan felt that the animal Paul suspected of being a southern species is the same as that seen by CSD in San Diego Bay. The bay specimens are more truncated and flattened posteriorly than those sampled offshore.

Mytilimeria nuttallii Conrad 1837 – commensal and associated with ascidians. To date it has only been seen by Kelvin.

Periplomatidae
Periploma spp – a radial fissure is present even in juveniles. We were cautioned that juvenile *Thracia* and *Periploma* look similar but *Thracia* has an external ligament.

Periploma planiusculum G. B. Sowerby I 1834 is smooth whereas *Periploma discus* Stearns 1890 is beaded even as small juveniles. Be careful not to confuse juv *P. planiusculum* with juv *Tellina modesta* (Carpenter 1864). But again, the presence of an external ligament in *Tellina* separates it from *Periploma*.

Periploma rosewateri F. R. Bernard 1989 – this is a deep water species, 600 – 1000 m, and to date has only been collected in Bight samples; it has a distinct radial fissure.

Publication Date: March 2025

Laternulidae
Exolaternula marilina (Reeve 1860) – the animal pictured in Tony's presentation might not be this species. A recent publication has Tony thinking the pictured animal is most likely a new species from Japan, not *marilina*. The specimen photographed was collected by ABC, at station 001 in 2013. It is the only locally recorded specimen so at this time it is being left at *E. marilina* with doubts. To date, ABC has not been able to locate the specimen.

Thraciidae

Thracia challisiana Dall 1915 – this is an intertidal species and has been found off Malibu. It is set apart from other *Thracia* species by external pustules on the valves. The pustules are similar to beading but are thicker and more pronounced.

Thracia curta Conrad 1837 – this species if found in shallower water; intertidal to 50 m. Tony has recorded it from 7-10 m.

Tony had a nice comparison slide showing *T. curta* and *Thracia trapezoides* Conrad 1849.

A reminder that *Thracia* spp will have an external ligament, whereas *Asthenotharus* spp have an internal ligament.

Lyonsiellidae
Policordia hispida Safonova & Barwick 2016 – this is a deeper water species and its shallowest local record is 411 m. It has also been collected by CSD (W. Enright) at Regional station 8338, 23 July 2014, 449 m. John Ljubenkov recorded a specimen from 1300 **ft** in 1984. Kelvin's original voucher sheet (*Policordia* sp A) is available in the Toolbox.

11 DECEMBER 2023 – SCAMIT ANNUAL ALL-HANDS, ZOOM

Attendance: Brent Haggin, Amber Von Tungeln, Cristina Fuentes, Wayne Dossett, Mac Power, LACSD; Erin Oderlin, Cody Larsen, Jennifer Smolenski, Craig Campbell, Danielle Ayala, Greg Lyon, Nicholas Galliani, CLAEMD; Andrew Davenport, Adam Webb, Lauren Valentino, Maiko Kasuya, Ricardo Martinez, Zoë Scott, Wendy Enright, Megan Lilly, CSD; Kelvin Barwick, Tony Phillips, DCE; Ben Ferraro, Ernie Ruckman, Rob Gamber, Shelly Walthers, OCSD; Alison Fisher, SFPUC; Linnea Nicole Mooney, Angelica Zavala Lopez, MTS; Megan Payne Ecoanalysts; Michael Vendrasco, Pasadena City College; Priyanka Soni (affiliation unknown).

The meeting was opened by Brent Haggin and he started the day by reviewing the meetings that occurred during 2023. In 2024 the goal is to make meetings hybrid (in-person with a Zoom option) whenever possible. LACSD and OCSD are both willing to host any and all meetings.

Kelvin Barwick had the floor next and gave some SLRC updates:

- Ed 14 was published by the deadline of July 1 2023 and is the accepted List to use for B'23 nomenclature
- 3,217 species reported
- Reminder – the SCAMIT Species List is not an all-inclusive faunal list of the SCB; rather it is a list of those species reported by SCAMIT members. This is an important distinction to keep in mind
- Discussed some species which were pulled from the List due to lack of sufficient documentation

- The geographic and ecological range of coverage has expanded
- SCAMIT Database project – thanks to Cody they've found that ITIS provides a down-loadable database structure. One thought is that we could take that structure and modify it to suit our needs. However, we would need dedicated personnel to make it happen and that is problematic for an all-volunteer organization.
  Cody Larsen chimed in that the level of interaction with the database is going to be fairly low so the amount of maintenance and upkeep might not be too onerous. The bulk of the work will be getting the database established. That aspect will require dedication and time and Cody is willing but simply doesn't have the time. He suggested starting with a small prototype and testing it before building the full database. Kelvin will put this subject on the agenda for the first SLRC meeting next year
- Ed 15 – will be a slow start due to everyone being busy with B'23. The publication date is TBD, and it will probably be a 2 year turn around; hoping for July 2025 publication but that may be ambitious

Erin Oderlin was next to have the floor and gave the Treasurer's report. She wanted to emphasize how much money we have available for grants. As for expenses, SCAMIT now has to pay a Zoom subscription and a $25 CA state fee. We are looking in to a high yield savings account, and are hoping to transfer $10k to one of those accounts so that we can earn a little interest on our funds. The 2022-2023 Treasury Summary is attached at the end of this newsletter.

Megan Lilly was next with her Secretary overview – She is still behind on newsletter production. She asked if anyone wanted to be a co-secretary or secretarial assistant? There was mostly crickets although Andy Davenport did volunteer to help with the production side of things. The newsletter is going to go electronic, but for now the newsletter cost in the Treasurer summary is inaccurate since there has been a delay in publishing, and therefore printing and mailing, which is where the newsletter expenses lie. SCAMIT is willing to buy an Adobe license for whoever serves as Secretary and creates and publishes the newsletter. Megan agreed to stay on as Secretary after she retires. There was some discussion about re-formatting the newsletter so it is simpler and a publication of basic minutes versus the narrative that Megan currently creates.

Leslie Harris was absent and unable to give the Vice President review, but Brent took her place and went on to fill the 2024 meeting calendar.

Next it was time to call for Officer Nominations. The current suite of Officers was nominated and all accepted.

- President – Brent Haggin
- Vice President – Leslie Harris
- Secretary – Megan Lilly
- Treasurer – Erin Oderlin
- Webmaster (not an elected position) – Cody Larsen

Brent made a special announcement – The SCAMIT Executive Committee is honoring Kelvin Barwick with a lifetime membership to SCAMIT for his many years of service as President of SCAMIT and now as the Chair of the SLRC. Thanks Kelvin!

The last agenda item for the day was an open forum round table discussion:

Should we go all digital for the newsletter? Kelvin asked how many institutional members do we have? Erin stated that there are quite a few but most of them opt out of the hard copy option. It was estimated we would have to double hard copy membership dues to cover the printing and mailing costs. Kelvin suggested that we send out the proposed change on the list server. He wants the actual constitutional changes sent out to membership for a vote. Zoë suggested creating a Google Form which holds the current language and proposed changes and a box to suggest changes to the language. Current memberships will be honored but for next year's renewals there will no longer be a paper option. Craig Campbell offered to calculate a rough estimate of what dues would be for a printed copy.

Updates to SCAMIT's personnel database – Erin inherited an Access database of SCAMIT members and there is a column for whether or not people are interested in consulting/contract work. She wants to update that column and will send a poll to membership.

There was a question about adding a digital suggestion box to the website where people can suggest meeting ideas; are people interested? Cody will research this option.

There was a suggestion of a website-hosted discussion forum. Cody would have to create a Google Groups which would allow for specific attendee access. Cody offered to look in to it.

Brent shared that The California Institute for Biodiversity has grant money available. He asked if SCAMIT would want to pursue funding to create a SCAMIT voucher collection of those species on the List? This discussion will be continued.

B'23 discussion – so far all is going well but the work has just started. Megan noted the presence of a juvenile *Enteroctopus dofleini* (Wülker 1910) in their trawls which is a new record for CSD.

Thoughts on Hybrid meetings? – there was positive feedback and the format will continue for future meeting.

Kelvin would like some feedback on the Toolbox. He will create a poll on how it's used and how often.

Brent asked that if members see names on the SCAMIT Species List that are wrong or outdated to please email Brent or Cody to have the issue corrected.

Meeting adjourned at 12:00

ARTHROPOD PERSONALS PART 3 BY D. CADIEN

Attached you will find Don's next installment in his arthropod personals series.

LITERATURE CITED

Coan, Eugene V., Paul Valentich Scott, & Frank R. Bernard. 2000. Bivalve Seashells of Western North America: Marine Bivalve Mollusks from Arctic Alaska to Baja California. Santa Barbara Museum of Natural History Monographs Number 2. Santa Barbara Museum of Natural History, Santa Barbara, California. 764pp.

Coan, Eugene and Paul Valentich-Scott. 2012. Bivalve Seashells of Tropical West America. Marine Bivalve Mollusks from Baja California to Northern Perú. Santa Barbara Museum of Natural History Monographs Number 6, Studies in Biodiversity Number 4. Parts I & II. 1258 pp.

Please visit the SCAMIT Website at: www.scamit.org

SCAMIT OFFICERS

If you need any other information concerning SCAMIT please feel free to contact any of the officers at their e-mail addresses:

President	Brent Haggin	(562)908-4288 x 5672	bhaggin@lacsd.org
Vice-President	Leslie Harris	(213)763-3234	lharris@nhm.org
Secretary	Megan Lilly	(619)758-2336	mlilly@sandiego.gov
Treasurer	Erin Oderlin	(310)648-5477	erin.oderlin@lacity.org

SCAMIT is a 501(c)(3) charity. The newsletter is published every two months and is distributed freely to members in good standing. Membership is $20 for an electronic copy of the newsletter, available via the web site at www.scamit.org, and $35 to receive a printed copy via USPS. Institutional membership, which includes a mailed printed copy, is $65. All correspondences can be sent to the Secretary at the email address above or to:

SCAMIT
PO Box 50162
Long Beach, CA 90815

A Review of the Family Capitellidae Grube, 1862 – Diagnoses of the Family and Genera, With Notes on the Species from the Southern California Bight – A Work in Progress

DISCLAIMER

This is a **DRAFT** version of a work in progress. All generic diagnosis listed below are based on my interpretations of the Family Capitellidae as I describe it within and emended from the most recent description in the literature as listed. Not all genera have remarks made regarding their status and recommendations to synonymize some groups are just that, a recommendation, as all descriptions are based solely on a literature review and **Type Material** has not yet been observed. That being said, I feel that the standardization of the family diagnosis, as well as the generic diagnoses, are a good starting point for future revision and better morphological grouping of the family Capitellidae. Future genetic work may show that the current taxonomic strategy within the Capitellidae does not hold.

This work only deals with the local genera that were presented during the September 2023 SCAMIT Polychaete meeting. For my thoughts on the remaining genera, please email for a more complete draft. Please send me any comments you may have as well.

Abstract

The family Capitellidae Grube, 1862 are small, earthworm-like polychaetes found in all depths globally. Historically, capitellid taxonomy has focused on the number of thoracic segments, thoracic chaetigers, and in particular, the distribution of capillary chaetae and hooded hooks in the thorax and anterior abdomen. Inconsistent application of an achaetous segment in generic and species descriptions has led to confusion within the family and a lack of easily distinguishable characters has led to the erection of numerous monotypic genera. A review of the literature and examination of type material has resulted in the emendation of all currently accepted genera, with a focus on a consistent application of an achaetous segment in the thorax to harmonize the generic diagnosis within the family.

Introduction

The family Capitellidae Grube, 1862 are small, earthworm-like polychaetes found in all depths globally. Some are particularly fond of organically enriched sediments and are considered pollution indicators while others have been used in studies of developmental biology (Warren, 1976a; Green, 2002). Some species inhabit tubes, but most are considered motile, deposit-feeders with different levels of feeding selectivity (Fauchald & Jumars, 1979).

Despite Eisig's (1887) monograph on capitellids, which provides substantial detail on morphology and anatomy, and Hartman's (1947) monograph, which provides details of the features of the hooded hooks, much confusion remains in the taxonomy. Capitellid taxonomy has historically focused on the number of thoracic chaetigers, and in particular, the distribution of capillary chaetae and hooded hooks within the thorax and anterior abdomen (M&BB, 2012), usually expressed as the thoracic formula. This has been complicated historically by the inclusion of an achaetous segment within the counts of thoracic segments of some, but not all, of the Capitellid genera. While problematic, the use of thoracic chaetal distribution remains the primary method for distinguishing the capitellid genera (Green, 2002).

As the family Capitellidae is defined, the peristomium is achaetous, and this achaetous peristomium is sometimes included in the counts of thoracic segments, such as in the 21 genera of *Abyssocapitella*, *Anotomastus*, *Barantolla*, *Capitellethus*, *Dasybranchethus*, *Dasybranchus*, *Decamastus*, *Dodecamastus*, *Heteromastus*, *Leiochrides*, *Mediomastus*, *Neomediomastus*, *Notodasus*, *Notomastus*, *Octocapitella*, *Parheteromastus*, *Peresiella*, *Polymastigos*, *Promastobranchus*, *Rashgua*, and *Undecimastus*. In 5 genera, such as *Amastigos*, *Baldia*, *Capitella*, *Eunotomastus*, and *Leiocapitella*, the achaetous peristomium is not included in the counts of thoracic segments and in 2 genera, such as *Mastobranchus* and *Scyphoproctus*, a true achaetous segment, one that possesses a ganglion and segmental nerves (Jones, 1961) and lateral organs (Green, 2002; Magalhães & Bailey-Brock, 2012; da Silva & Amaral, 2019), are present, as well as, the achaetous peristomium. Further complicating the matter, is the fact that the achaetous segment listed in some of the generic diagnoses is rarely explicitly defined as being the peristomium or another segment. This is true for the 13 genera of *Capitobranchus*, *Leiocapitellides*, *Leiochrus*, *Lumbricomastus*, *Neoheteromastus*, *Neonotomastus*, *Neopseudocapitella*, *Nonatus*, *Paracapitella*, *Parheteromastides*, *Pseudocapitella*, *Pseudoleiocapitella*, and *Pseudonotomastus*. Tomioka *et al*. (2018) used the width of the head relative to the first segment as one of their characters to identify an individual to the genus level. In this they defined the "head" as consisting of the prostomium and peristomium, and the first segment as the first true segment, whether chaetous or

achaetous. Ignoring the peristomium, as it is achaetous by definition, from the counts of the thoracic segments allows for a consistent diagnosis of each Capitellid genus and leads to the thoracic formulas and emended generic diagnoses given within.

According to WoRMS, there are currently 222 described species in 41 genera, 20 of which contain only a single species. This inconsistency in how the family has been interpreted, coupled with the ontogenetic changes that occur in the number of segments with capillary chaetae during development (Warren, 1976b; Blake, 2000), has likely led to the high number of genera with only a single described species (Green, 2002, M&BB, 2012). A comprehensive review of the type material, coupled with genetic analysis, would likely be needed to resolve this issue.

The Southern California Association of Marine Invertebrate Taxonomists (SCAMIT) compile *A Taxonomic Listing of Benthic Macro- and Megainvertebrates from Infaunal & Epifaunal Monitoring and Research Programs in the Southern California Bight* every few years to aid in the standardization of name usage across the Southern California Bight for the multiple marine monitoring surveys that are conducted annually throughout the region. The 14th edition of the list (SCAMIT, 2023) list 26 Capitellid species in 14 genera. Two of the species listed in SCAMIT Edition 14 are a known species complex, *Capitella capitata* Cmplx and *Heteromastus filiformis* Cmplx, and a third is reported only as *Barantolla* sp. Members of the genus *Mediomastus* are typically identified only as *Mediomastus* sp. due to their small size and limited number of distinguishable characters. A neotype for *Capitella capitata* (Fabricius, 1780) has been designated and was redescribed by Blake (2009), and its distribution restricted to the Arctic Ocean around West Greenland. This allows for the comparison of characters from local constituents of *Capitella capitata* Cmplx to designate local provisional species. As of the publication of Blake (2009), 12 to 13 biologically distinct sibling species of the *Capitella capitata* Cmplx have been identified in laboratory culture, and the previous concepts of *Capitella capitata* based on the works of Eisig (1887), Hartman (1947) and Warren (1976) refer to other species that differ significantly from the Greenland specimens (Blake, 2009).

Systematics

Class Polychaeta
Subclass Sedentaria
Infraclass Scolecida
Family Capitellidae Grube, 1862
Type Genus: *Capitella* Blainville, 1828, by monotypy

Diagnosis (emended after Magalhães & Blake, 2020 and Blake, 2000). Capitellids range from very small (1-2 mm), threadlike forms to large, robust, earthworm-like forms exceeding 20 cm in length. The body bears a *cephalic region* with a small *conical or rounded* prostomium, *with or without a terminal palpode*, that lacks appendages and an *achaetous peristomium*, partly fused with the prostomium or forming a distinct ring. A pair of eversible nuchal organs (ciliated pits when not everted) are located near the posterior border of the peristomium. Eyes, when present on the prostomium, tend to be small, subdermal, and appear as paired single or multiple spots dorsolaterally on the posterior portion of the prostomium, and are sometimes recessed below the peristomium. Proboscis eversible, unarmed, sometimes proximally papillated and distally smooth. The thorax contains up to 20 chaetigers, *sometimes with a true achaetous segment bearing lateral organs. Capillary chaetae, spatulate chaetae, genital spines and hooded hooks can be found in the fascicles of the thorax, in various combinations*, and are important for generic diagnosis. A long, narrow, sometimes tattered-appearing abdominal region contain a variable number of segments that can be modified in some genera. Abdominal chaetae consist of either capillary chaetae or hooded hooks, *or may have acicular spines in pre-pygidial segments*. Branchiae, when present, are always located in the abdominal region. Nephridial openings can be found in both the thorax and abdomen. Parapodia are simple tori, but better developed in abdominal segments. The pygidium normally bears a caudal cirrus but *can be without cirrus or modified as an anal plaque*.

Remarks. The chaetal arrangement of the thorax is one of the most important taxonomic characters used to separate the genera. The presence of capillary chaetae or mixed fascicles in the abdomen is also an important character. The various patterns have been illustrated by Hartman (1947), Fauchald (1972) and Ewing (1984). The thoracic formula is used in this paper and are given for all the genera of Capitellids. The genital spines of the genus Capitella are found in the notopodia of the last 2 thoracic chaetigers. The hooded hooks typically have a fairly straight shaft with a distinct manubrium at the point where the hook emerges from the body. The main fang is bent at a nearly right angle to the shaft and is surmounted by few to many apical teeth in 1-4 rows above the main fang. The structure and dentition of the hooded hooks may be important characters for separating the genera with overlapping thoracic formulae.

Legend to the thoracic formulas contained within

achaetous segment + $^{\text{(thoracic notopodia)}}/_{\text{(thoracic neuropodia)}}$ + $^{\text{(abdominal notopodia)}}/_{\text{(abdominal neuropodia)}}$

c=capillary chaetae
h=hooded hooks
e=either capillaries or hooded hooks
m=mixed fascicle of capillaries & hooded hooks
g=genital spines
s=spatulate chaetae
p=paddlelike chaetae
(-)=achaetous segment present
0=without chaetae (used for incomplete 1st chaetigers)

Genus *Amastigos* Piltz, 1977

Type Species: *Amastigos acutus* Piltz, 1977, by original designation

Diagnosis [emended after Magalhães & Blake, 2020 and Piltz, 1977] Prostomium conical, palpode absent; peristomium *achaetous, short; eyespots present*. Thorax with 8 chaetigers; *achaetous segment absent*; capillary chaetae entirely absent, hooded hooks only present in both notopodia and neuropodia of both thorax and abdomen; transition from thorax to abdomen abrupt at chaetiger 9. No visible branchiae or nephridial papillae. Lateral organs not described. Pygidium conical, with or without anal cirris.

Thoracic formula: $^{(8h)}/_{(8h)}$

Remarks *Amastigos* is one of only two genera, *Baldia* being the other, that completely lack capillary chaetae. Both genera have hooded hooks only in both the notopodia and neuropodia of all chaetigers. The two differ only in the number of thoracic chaetigers, degree of fusion of the prostomium and peristomium, and the presence (*Amastigos*) or absence (*Baldia*) of eyespots. The presence of 9 thoracic chaetiger is within the range of reported variability for *Amastigos* so the taxonomic status of the two genera should be revisited (Magalhães & Blake, 2020) as the other characters that separate the genera are more species-specific rather than generic characters. Fresh collections for genetic analysis would be required to determine the validity of the genus *Baldia*. Three species of *Amastigos* have been described globally, with one species described from southern California.

Amastigos acutus Piltz, 1977

See Piltz (1977) A New Genus and Species of Polychaete (Family Capitellidae) from Southern California. *Bulletin of the Southern California Academy of Sciences* 76(1): 57-60 for a description and images of *Amastigos acutus*. See Garciá-Garza & de León-González (2011) Review of Capitellidae (Annelida, Polychaeta) from the Eastern Tropical Pacific region, with notes on selected species. *ZooKeys* 151: 17-52 for additional comments on *A. acutus*.

Genus *Anotomastus* Hartman, 1947

Type species: *Anotomastus gordioides* (Moore, 1909) as *Eunotomastus gordioides*, by monotypy

Diagnosis [emended after Magalhães and Blake, 2020 and Fauchald, 1977] *Prostomium* conical, palpode absent; *peristomium achaetous, clearly distinct from the prostomium;* eyespots present as multiple spots; nuchal organs present. Thorax with 17 or 18 chaetigers; *achaetous segment absent*; first chaetiger incomplete, notopodia only; chaetigers 2 thru 16-17 with capillary chaetae only; last thoracic chaetiger with capillaries in the notopodia and mixed fascicle of capillaries and hooded hooks in the neuropodia. Abdomen with many segments; abdominal chaetigers with long-handled hooded hooks only. Palmately branched branchiae in posterior abdominal segments. Lateral organs present on all thoracic chaetigers. Nephridial papillae present in the segmental furrows of some thoracic chaetigers.

Thoracic formula: $^{(17\text{-}18c)}/_{(0+15\text{-}16c+1m)}$

Remarks *Pseudocapitella* is similar to the genus *Anotomastus* in having 17 thoracic chaetigers and the first chaetiger uniramous, differing only in the number of thoracic chaetigers with neuropodial hooded hooks (3 in *Pseudocapitella* versus 1 in *Anotomastus*).

Anotomastus gordiodes (Moore, 1909)

See voucher sheet that was created for this species and published in SCAMIT Newsletter 41(3&4).

Genus *Barantolla* Southern, 1921

Type species: *Barantolla sculpta* Southern, 1921, by original designation

Diagnosis [emended after Blake, 2000]. Prostomium oval to conical, with terminal palpode; eyes present or absent; *peristomium achaetous*. Thorax with 11 chaetigers; *achaetous segment absent*; chaetiger 1 with neurochaetae present or absent. Notopodia with capillary chaetae only thru chaetiger 6; chaetiger 7 with mixed fascicle of capillaries and hooded hooks or with hooded hooks only; chaetigers 8-11 with hooded hooks only. Neuropodia with capillary chaetae in *chaetigers 1 or 2 thru 6 or 8*, remaining thoracic neuropodia with hooded hooks only. Branchiae present or absent, when present with 3 or more lobes. Pygidium without appendages.

Thoracic formula: $^{(6c+1m(h)+4h)}/_{(0+5c+5h)}$ or $^{(6c+1m(h)+4h)}/_{(8c+3h)}$

Barantolla americana Hartman, 1963

See Hartman (1963) Submarine canyons of southern California. Part III. Systematics: Polychaetes. *Allan Hancock Pacific Expeditions* 27(3): 1-93 and Blake (2000) Family Capitellidae Grube, 1862. pages 47-96. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 7 – The Annelida Part 4 – Polychaeta: Flabelligeridae to Sternaspidae* for descriptions of *Barantolla americana*.

Remarks Blake (2000) expaned the range of *Barantolla americana* north to Washington based on an unpublished list but also acknowledged that a different, still undescribed species of *Barantolla* is present in Puget Sound and the Northeast Pacific based on a personal communication with R. E. Ruff. *Barantolla americana* should have its range restricted to California until additional samples from northern regions can be obtained for comparison.

In the past, LACSD has reported 4 individuals as *Barantolla* sp. Upon further review, these individuals were determined to not belong to the Genus *Barantolla*. All 4 individuals were small juveniles, but all had more than 7 chaetigers with capillary notochaetae.

Genus *Capitella* Blainville, 1828

Branchiocapitella Fauvel, 1932. *Fide* Magalhães & Bailey-Brock, 2012 – subjective synonym
Capitellides Mesnil, 1897. *Fide* Warren, 1991 – subjective synonym
Capitomastus Eisig, 1887. *Fide* Warren, 1991 – subjective synonym
Isomastus Gravier, 1911. *Fide* Hartman, 1947 – subjective synonym
Lumbriconais Örsted, 1842, in Grube, 1850 – subjective synonym
Malta Stephenson, 1908. *Fide* Hartman, 1959 – subjective synonym
Valla Johnston, 1865. *Fide* Hartman, 1959 – subjective synonym

Type species: *C. capitata* (Fabricius, 1780) as *Lumbricus capitatus*, by monotypy. Redescribed by Blake (2009).

Diagnosis [emended after Silva *et al.* 2017 and Silva *et al.* 2016] Prostomium conical to bluntly rounded, sometimes dorsoventrally flattened, with dorsal groove present or absent, with nuchal organs as paired slits at border between prostomium and peristomium; eyes present or absent. Peristomium forming a complete or incomplete achaetous ring. *Thorax with nine chaetigers*; *achaetous segment absent*; *first chaetiger complete*; with capillary chaetae in both rami of chaetigers 1-3, 1-4, 1-6, or 1-7, or capillaries and hooded hooks in various combinations in both rami; chaetigers 8 and 9 with all capillaries, mixed fascicles of capillaries and hooded hooks or hooded hooks only; arrangement is sometimes size dependent. Genital hooks present in notopodia of chaetigers 8 and 9 of males and hermaphrodites; females usually with enlarged lateral genital pores between chaetigers 7-8 or 8-9. Capillary chaetae unilimbate, hooded hooks with multiple rows of denticles above the main fang. Abdominal segments with hooded hooks in both rami, without capillaries. Branchiae present or absent. Pygidium without appendages.

Thoracic formula: variable based on species; *Capitella capitata* formula (♂ , ♀) $^{(7c+2g)}/_{(7c+2h)}$

Capitella capitata (Fabricius, 1780), redescribed by Blake, 2009

Lumbricus capitatus Fabricius, 1780 – basionym
Ancistria acuta Verrill, 1874 – subjective synonym
Capitella capitata belgica Czerniavsky, 1881 – subjective synonym
Capitella capitata danica Czerniavsky, 1881 – unaccepted
Capitella capitata hebridarum Czerniavsky, 1881 – subjective synonym
Capitella capitata neapolitana Czerniavsky, 1881 – subjective synonym
Capitella capitata suchumica Czerniavsky, 1881 – subjective synonym
Capitella fabricii Blainville, 1828 – subjective synonym
Capitella intermedia Czerniavsky, 1881 – subjective synonym
Capitella prototypa Czerniavsky, 1881 – subjective synonym
Capitella similis Czerniavsky, 1881 – subjective synonym
Lombricus canalium Nardo, 1847 – subjective synonym
Lumbriconais marina Örsted, 1842 – subjective synonym

Lumbricus ciliatus Müller, 1773 – subjective synonym
Lumbricus littoralis Johnston, 1827 – subjective synonym
Matla bengalensis Stphenson, 1908 – subjective synonym
Saenuris barbata Grube, 1860 – synonym
Valla ciliata (Müller, 1773) – subsequent combination of subjective synonym

See Blake (2009) Redescription of *Capitella capitata* (Fabricius) from West Greenland and designation of a neotype (Polychaeta, Capitellidae). *Zoosymposia* 2: 55-80 for the redescription and images of *Capitella capitata*.

Thoracic Formula: (♂ / ♀) $^{(7c+2g)}/_{(7c+2e)}$

Remarks Blake (2009) redescribed *Capitella capitata* and restricted the range to the type locality of Greenland, allowing for the comparison of local species previously identified within the *Capitella capitata* Cmplx. A review of LACSD specimens has so far yielded 1 new provisional species previously identified as *Capitella capitata* Cmplx, *Capitella* sp LA3 Haggin, 2023 §, described below. Staining variations from San Diego specimens suggest that at least 2 other provisional species are present within this complex as well.

Capitella capitata oculata Hartman, 1961

See Hartman (1961) Polychaetous Annelids from California. *Allan Hancock Pacific Expeditions* 25: 1-224 for a description of *Capitella capitata oculata*.

Thoracic Formula: ♂ $^{(7c+2g)}/_{(7c+2h)}$; ♀ $^{(7c+2h)}/_{(7c+2h)}$

Remarks When described, *Capitella capitata oculata* was found to be hosting a parasitic copepod, *Monstrilla capitellicola*. The presence of black eyes distinguishes this species from *Capitella teleta*, which has red eyes.

Capitella capitata tripartita Hartman, 1961

See Hartman (1961) Polychaetous Annelids from California. *Allan Hancock Pacific Expeditions* 25: 1-224 for a description of *Capitella capitata tripartita*.

Thoracic Formula: ♂ $^{(3c+1c(m)+2m+1m(h)+2g)}/_{(3c+2m+2m(h)+2h)}$ ♀ $^{(3c+1c(m)+2m+1m(h)+2h)}/_{(3c+2m+2m(h)+2h)}$

Remarks When described, *Capitella capitata tripartita* was found to be hosting a parasitic copepod, *Monstrilla capitellicola*.

Capitella ovincola Hartman, 1947

Capitella capitata ovincola Hartman, 1947 – of Hartman (1959), not Hartman (1947)

See Hartman (1947) Polychaetous Annelids. Part VII. Capitellidae. *Allan Hancock Pacific Expeditions* 10(4): 391-481 and Blake (2000) Family Capitellidae Grube, 1862. pages 47-96. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 7 – The Annelida Part 4 – Polychaeta: Flabelligeridae to Sternaspidae*. Santa Barbara Museum of Natural History for descriptions and images of *Capitella ovincola*.

Thoracic Formula: ♂ $^{(5c+2c(m)+2g)}/_{(4c+3c(m)+2h)}$ ♀ $^{(5c+2c(m)+2h)}/_{(4c+3c(m)+2h)}$

Remarks *Capitella ovincola* is known only from squid egg masses.

Capitella teleta Blake, Grassle & Eckelbarger, 2009

See Blake, Grassle & Eckelbarger (2009) *Capitella teleta*, a new species designation for the opportunistic and experimental *Capitella* sp. I, with a review of the literature for confirmed records. *Zoosymposia* 2: 25-53 for a description and images of *Capitella teleta*.

Thoracic Formula: ♂ $^{(7c+2g)}/_{(7c+2h)}$; ♀ $^{(7c+2h)}/_{(7c+2h)}$

Remarks *Capitella teleta* was originally identified and described from laboratory cultures in Woods Hole, Massachusetts. This species has since been confirmed to be present in southern California via DNA analysis. *Capitella teleta* can be distinguished locally by the presence of red eyes, rather than black eyes as in *Capitella capitata oculata*.

***Capitella* sp LA3** Haggin, 2023 §

Capitella capitata Cmplx of authors SCB

See attached provisional voucher sheet

Thoracic Formula: ♂, ♀ $^{(4c+3h+2g)}/_{(4c+5h)}$; juveniles $^{(4c+4h+1g)}/_{(4c+5h)}$ or $^{(4c+5h)}/_{(4c+5h)}$

Genus *Dasybranchus* Grube, 1850

Branchoscolex Schmarda, 1861. *Fide* Augener, 1918 – subjective synonym
Bucherta Rullier, 1965. *Fide* Gallardo, 1968 – subjective synonym
Dasymallus Grube, 1846(1850??). *Fide* Fauchald, 1977 – junior homonym, replaced by *Dasybranchus*

Type species: *Dasymallus caducus* Grube, 1846, by monotypy

Diagnosis [emended after Magalhães & Blake, 2020 and Green, 2002] *Prostomium rounded or conical, palpode present or absent; peristomium achaetous, clearly distinct from the prostomium; eyespots present in multiple spots or absent; nuchal organs present. Thorax with 13 chaetigers*; *achaetous segment absent*; chaetiger 1 biramous; capillary chaetae only. *Abdominal chaetigers with hooded hooks only in both rami*; abdominal parapodial tori without expanded lobes. Branchiae retractile or nonretractable, as simple filaments or branched tufts, arising from superior edge of neuropodia on median and posterior abdominal segments. Genital pores beginning on posterior end of thorax. Lateral organs present on thorax and abdomen. Pygidium simple, without cirri.

Thoracic formula: $^{(13c)}/_{(13c)}$

Remarks The thoracic formula and generic diagnosis of *Nonatus* matches that of the genus *Dasybranchus*. A detailed review of the type of *Nonatus longilineus* to compare the structure and dentition of the abdominal hooded hooks and fresh collections for genetic analysis would be needed to determine the validity of the genus *Nonatus*.

Dasybranchus glabrus Moore, 1909

See Moore (1909) Polychaetous annelids from Monterey Bay and San Diego, California. *Proceedings of theAcademy of Natural Sciences of Philadelphia* 61: 235-295 and Hartman (1947) Polychaetous Annelids. Part VII. Capitellidae. *Allan Hancock Pacific Expeditions* 10(4): 391-481 for descriptions and images of *Dasybranchus glabrus*.

See Fauchald & Hancock (1981) Deep-water polychaetes from a transect off central Oregon. *Allan Hancock Monographs in Marine Biology* 11: 1-73 and Garciá-Garza & de León-González (2011) Review of Capitellidae (Annelida, Polychaeta) from the Eastern Tropical Pacific region, with notes on selected species. *ZooKeys* 151: 17-52 for comments on the distribution of *D. glabrus*.

Dasybranchus lumbricoides Grube, 1878

A modern description of the species can be found in Uebelacker & Johnson (1984) Taxonomic guide to the polychaetes of the northern Gulf of Mexico or López *et al.* (2005) Capitellidae from Coiba National Park, Pacific Coast of Panamá, with a new species of the genus *Amastigos*. *Cahiers de Biologie Marine* 46: 57-67 but neither description is from the type locality.

Remarks The main characteristics of *Dasybranchus lumbricoides* are retractile branchiae present in median and posterior segments, and the abdominal hooded hooks have a main fang surmounted by 20 teeth in 3-4 rows. This species was originally described from the Philippine Islands and now has a reported cosmopolitan distribution. The single report by CLAEMD from Ballona Lagoon should be treated as a local provisional species.

***Dasybranchus* sp SD1** Rowe, 2004 §

This species was reported by CSD during Bight '03 regional monitoring from 100 meters. It has 13 thoracic chaetigers and the thorax is biannulated with deep furrows.

Remarks This species is currently on the SCAMIT hold-list pending additional documentation.

Genus *Decamastus* Hartman, 1963

Type species: *Decamastus gracilis* Hartman, 1963, by original designation

Diagnosis [emended after Magalhães & Blake, 2020 and Hernández-Alcántara *et al.*, 2019] Prostomium short, conical, palpode present or absent; eyespots present or absent; *peristomium achaetous, not clearly distinct from the prostomium*. Thorax with 10 chaetigers; *achaetous segment absent*; first chaetiger complete or with notopodia only; capillary chaetae only in both rami or last 1-2 thoracic chaetigers with mixed fascicles of capillaries and hooded hooks in neuropodia. Abdomen with multidentate hooded hooks in both rami. Branchiae absent. Genital pores and lateral organs not described. Pygidium simple, *without cirri*.

Thoracic formula: $^{(10c)}/_{(0+9c)}$ or $^{(10c)}/_{(8(9)c+2(1)m)}$

Decamastus gracilis Hartman, 1963

See Hernández-Alcántara *et al.* (2019) A new species of *Decamastus* Hartman, 1963 (Polychaeta: Capitellidae) from the Gulf of California, with remarks on its habitat. *Marine Biodiversity* 49(3): 1123-1130 for the most recent description and images of *Decamastus gracilis*.

Genus *Dodecamastus* Blake, 2000

Type species: *Dodecamastus mariaensis* Blake, 2000, by original designation

Diagnosis [emended after Magalhães & Blake, 2020 and Blake, 2000] Prostomium short, conical, palpode absent; eyespots absent; nuchal organs not apparent; peristomium achaetous, clearly distinct from the prostomium. Thorax with 12 chaetigers; *achaetous segment absent*; chaetiger 1 complete; chaetigers 1-10 with capillary chaetae in both rami; chaetigers 11 and 12 with hooded hooks in both rami. Abdominal chaetigers with hooded hooks only. Branchiae present, branched, superior to notopodia. Genital pores and lateral organs not described. Pygidium without appendages.

Thoracic formula: $^{(10c+2h)}/_{(10c+2h)}$

Dodecamastus mariaensis Blake, 2000

See Blake (2000) Family Capitellidae Grube, 1862. pages 47-96. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 7 – The Annelida Part 4 – Polychaeta: Flabelligeridae to Sternaspidae*. Santa Barbara Museum of Natural History for original description and images of *Dodecamastus mariaensis*.

Remarks Blake's original description did not include the pygidium as his specimen was incomplete. A review of LACSD vouchers yielded a complete (though regenerating) individual. Based on this individual the pygidium is known to be a terminal ring with 1 pair of fleshy to filamentous anal cirri inserted laterally (image below, photo by B. Haggin, STN B13-9210).

Dodecamastus mariaensis is the only species currently assigned to the genus. Locally, the species may be mistaken for *Decamastus* because the first 10 chaetigers bear only capillary chaetae. However, there are actually 12 thoracic chaetigers, the last two bearing only hooded hooks. The abdominal segments can be readily identified by the development of a long, lateral chaetal flange. The posterior, branched branchiae are also diagnostic, and not known for any species of *Decamastus*.

Locally, *Dodecamastus mariaensis* is readily distinguished from other species by the conspicuous methyl green staining pattern where the twelfth thoracic chaetiger stains an intense turquoise, unlike any other segment on the body.

Genus *Heteromastus* Eisig, 1887

Ancistria Quatrefages, 1866. *Fide* Hartman, 1947 – junior homonym, replaced by junior synonym *Heteromastus*
Areniella Verrill, 1874. *Fide* Hartman, 1947 – subjective synonym

Type species: *Capitella filiformis* Claparède, 1864, by monotypy. Redescribed by Hutchings & Rainer, 1981.

Diagnosis [emended after Magalhães & Blake, 2020 and Magalhães & Bailey-Brock, 2012] Prostomium short to long, conical, sometimes tapering; palpode absent; eyespots present or absent, when present, paired; nuchal organs present; *peristomium achaetous, clearly distinct from the prostomium. Thorax with 11 chaetigers*; *achaetous segment absent*; chaetiger 1 complete; chaetigers 1-5 with capillary chaetae in both rami; chaetigers 6-11 with long-*handled* hooded hooks. Abdominal chaetigers with short-*handled* hooded hooks only. Branchiae may be present or absent on posterior abdominal segments, when present, digitate or branched, notopodial. Genital pores on thorax from chaetigers 7-11. Lateral organs distinct on thorax and indistinct on abdomen. Pygidium with ventral caudal cirrus.

Thoracic formula: $^{(5c+6h)}/_{(5c+6h)}$

Heteromastus filiformis (Claparéde, 1864), redescribed by Hutchings & Rainer, 1982

Capitella filiformis Claparède, 1864 – superseded original combination
Ancistria capillaris Verrill, 1874 – subjective synonym
Ancistria minima Quatrefages, 1866 – subjective synonym

Areniella filiformis Verrill, 1874 – subjective synonym
Capitella costana Claparède, 1869 – subjective synonym
Capitella fimbriata Van Beneden, 1857 – subjective synonym
Notomastus filiformis Verrill, 1873 – subjective synonym
Notomastus laevis Webster, 1886 – unaccepted

See Hutchings & Rainer (1982) Designation of a neotype of *Capitella filiformis* Claparède, 1964, type species of the genus *Heteromastus* (Polychaeta: Capitellidae). *Records of the Australian Museum* 34(4): 373-380 for their redescription and images of *Heteromastus filiformis*.

See Blake (2000) Family Capitellidae Grube, 1862. pages 47-96. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 7 – The Annelida Part 4 – Polychaeta: Flabelligeridae to Sternaspidae*. Santa Barbara Museum of Natural History and Choi & Yoon (2016) First record of *Heteromastus filiformis* (Polychaeta: Capitellidae) from Korean waters, with a taxonomic note on the genus. *Journal of Species Research* 5(3): 264-271 for descriptions of Californian and Korean records of *Heteromastus filiformis* respectively.

Remarks These three descriptions show that this is a species complex and not a species with cosmopolitan distribution, and local specimens should be given a provisional designation. LACSD has started using *Heteromastus* sp LA3 Haggin, 2023 § (described below) for NEP *Heteromastus filiformis* in our collections.

Heteromastus filobranchus Berkeley & Berkeley, 1932

See Blake (2000) Family Capitellidae Grube, 1862. pages 47-96. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 7 – The Annelida Part 4 – Polychaeta: Flabelligeridae to Sternaspidae*. Santa Barbara Museum of Natural History for the most recent description of *Heteromastus filobranchus*.

Remarks LACSD reported 50+ *Heteromastus filobranchus* per survey prior to 2003. After 2003 reports dropped to between 2 and 10 occurrences per survey and hasn't been reported since 2016. LACSD's Joint Water Pollution Control Plant switched to a full secondary treatment process in 2003, reducing our outfalls particulate output to the low levels that we are currently discharging. This species may prefer a more impacted sediment or prefer a habitat with sediment sizes no longer found in our regular sampling area.

Southern California records of this species are doubtful and upon review may be referred to the provisional species *Heteromastus* sp LH1 Harris 20?? § (description below).

***Heteromastus* sp LA3** Haggin, 2023 §

Heteromastus filiformis of authors SCB, not (Claparéde, 1864)

See attached provisional voucher sheet

***Heteromastus* sp LH1** Harris, 20?? §

Heteromastus sp LH1 has filiform branchiae in the abdomen from chaetigers 55-100 with up to 8 filaments. The thorax stains uniformly with Methyl Green Stain. The anterior abdomen stains with the dorsal half of each segment dark, forming a continuous stripe down the body, the posterior margins staining with darker spots. This species was originally collected from Newport Canyon from a depth of approximately 450m.

Remarks *Heteromastus* sp LH1 can be differentiated from *Heteromastus filobranchus* by the later insertion of the branchiae, chaetigers 55-100 versus chaetigers 30-50 in *H. filobranchus*, and the reduced number of branchial filaments, 8 in *Heteromastus* sp LH1 compared to 16 in *H. filobranchus*.

***Heteromastus* sp MEC1** ??

Remarks This species is currently on the SCAMIT hold-list pending documentation. No information other than a name is available.

Genus *Leiochrides* Augener, 1914

Notobranchus Capaccioni-Azzati & El-Haddad, 2015 – new name for homonym *Pseudomastus*, a subjective synonym of *Leiochrides*
Pseudomastus Capaccioni-Azzati & Martin, 1992. *Fide* Jeong *et al*., 2017 – subjective synonym, but firstly unavailable as a homonym, replaced by *Notobranchus*

Type species: *Leiochrides australis* Augener, 1914, by original designation

Diagnosis [emended after Magalhães & Blake, 2020 and Jeong *et al*., 2017] Prostomium rounded or conical; palpode absent; eyespots present or absent; nuchal organs present; peristomium *achaetous*, clearly distinct from prostomium. Thorax with 12 chaetigers; *achaetous segment absent*; chaetiger 1 complete or incomplete, chaetigers 1-10 with capillary chaetae in both rami; chaetigers 11-12 with capillary chaetae in both rami or with capillary chaetae in notopodia and hooded hooks in neuropodia. Thorax clearly demarked from abdomen. Abdominal chaetigers with

hooded hooks only. Parapodia reduced. Branchiae present or absent; when present, branched, retractile, notopodial. Genital pores in four pairs from chaetigers 7-8. Lateral organs present only in thorax. Pygidium simple, unadorned.

Thoracic formula: $^{(12c)}/_{(10c+2e)}$ or $^{(12c)}/_{(0+9c+2e)}$

Remarks There seems to be some confusion in Fauchald's (1977) diagnosis of the genus, possibly due to a comment made by Harmelin when comparing *Pseudoleiocapitella* to *Pseudomastus*, resulting in a reduction of thoracic chaetigers. Reviewing the original generic diagnosis, species description of *Pseudoleiocapitella fauveli* and the images provided in Harmelin (1964), it is clear that *Pseudoleiocapitella* should have 12 thoracic chaetigers. Thoracic chaetigers with notopodial capillaries and neuropodial hooded hooks is a common diagnosis of many capitellid genera, and the change in dentition between chaetigers 11-12 and the remaining chaetigers reinforce this idea. The emended generic diagnosis above is based mostly off of Harmelin's (1964) original description and corrects the incorrect diagnosis given in Fauchald (1977).

As the presence or absence of neuropodia on the first chaetiger seems to be more of a species level character, rather than a generic level, *Pseudoleiocapitella* may be synonymized with *Leiochrides*. The emended generic diagnosis shows its thoracic formula to be the same as *Leiochrides*, with the exception of the incomplete first chaetiger. A detailed examination of the abdominal hooded hooks would be needed to fully resolve this.

This interpretation of *Pseudoleiocapitella* differs from that given in Magalhães & Blake (2020).

Leiochrides hemipodus Hartman, 1960

See Hartman (1960) Systematic account of some marine invertebrate animals from the deep basins off southern California. *Allan Hancock Pacific Expeditions* 22(2): 69-216 and Blake (2000) Family Capitellidae Grube, 1862. pages 47-96. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 7 – The Annelida Part 4 – Polychaeta: Flabelligeridae to Sternaspidae*. Santa Barbara Museum of Natural History for descriptions and images of *Leiochrides hemipodus*.

Leiochrides pallidior (Chamberlin, 1918)

Notomastus pallidior Chamberlin, 1918 – unaccepted

Remarks Blake (2000) commented that *Leiochrides pallidior* (originally described as *Notomastus pallidior*) from Pacific Grove, California was referred to the genus *Leiochrides* by Hartman, 1947 thru a process of elimination and Garciá-Garza & de León-González (2011) commented that this is a poorly known species and all descriptions have been incomplete. This species should be considered *incertae sedis*, because it was incompletely described and not illustrated, until the type material can be re-examined.

***Leiochrides* sp A** Harris, 1985 §

Description [from SCAMIT 3(11)] The body is slender, cylindrical and moderately small. Total length may not exceed 30 mm, of which the thorax is 5.3 mm, and 28 abdominal segments measure 19 mm. None of the specimens is complete but the total number of segments may be about 50. Separation between thorax and abdomen is not marked except for a change in parapodia, where setae are abruptly replaced by uncini. The prostomium is a short, bluntly rounded lobe without eyes. The thoracic epithelium, like that of the abdomen, is smooth and glistening. The peristomium or first visible segment lacks parapodia and is somewhat longer than the next or first setigerous segment. This has notopodia, but lacks neuropodia. The next is biramous and resembles those of the following one. All have pointed setae only, emerging in lateral series. In the first few segments the parapodial ridges are at the midlength of the segment ; in the last several thoracic segments, the ridges are gradually farther back.

In larger individuals the first 5 thoracic segments are somewhat set off from the next by being somewhat inflated.

Prostomium followed by an achaetous peristomium; thoracic notopodia number 12 pairs with pointed setae only; thoracic neuropodia number 11 pairs, with pointed setae.

Long-handled hooded hooks are present in abdominal segments. Branchiae are present in abdominal segments, perhaps not before the middle region. At best development, they consist of 3 to 10-12 long, filiform, non-retractile lobes in palmate arrangement, and emerge from the notopodial lobe, posterior to the uncinial ridge. An occasional filament is bifurcated along its length.

Methyl Green Staining Pattern Unknown

Thoracic Formula: $^{(12c)}/_{(0+9c+2h)}$

Remarks *Leiochrides* is known for few species (see Hartman, 1947, p. 429) from shallow sea bottoms. *L. hemipodus* differs from others in that abdominal segments have palmately divided branchiae. It is known only from the basins of southern California and is presumed to be a deep water form. This description is very similar to *Leiochrides hemipodus* and may be synonymous.

Genus *Mediomastus* Hartman, 1944

Capitita Hartman, 1947. *Fide* Fauchald, 1977 – subjective synonym

Type species: *Mediomastus californiensis* Hartman, 1944

Diagnosis [emended after Magalhães & Blake, 2020 and Green, 2002] Body small, thread-like. *Prostomium conical, palpode present; eyespots present or absent, when present, in multiple spots; peristomium achaetous,* clearly distinct from the prostomium. Proboscis papillated. Thorax with 9-11 chaetigers, usually 10; *achaetous segment absent*; chaetigers 1-4 with capillary chaetae in both rami; remaining thoracic chaetigers with long-handled hooded hooks; sometimes paddlelike chaetae may be present in thoracic chaetigers. Thorax not clearly demarcated from the abdomen. Abdominal chaetigers with short-handled hooded hooks in both rami; occasionally with capillary chaetae in notopodia of far posterior abdominal chaetigers. Branchiae absent. Genital pores in three pairs from chaetigers 7-8 or 8-9 but difficult to observe. Lateral organs present on thorax and inconspicuous in abdomen. Pygidium terminal with mid-ventral caudal cirrus.

Thoracic formula: $^{(4c+6(5\text{-}7)h)}/_{(4c+6(5\text{-}7)h)}$

Remarks The generic diagnosis of *Mediomastus* Hartman, 1944 was emended by Warren et al. (1994) to expand the thoracic chaetiger range from 10 to 9-11. The thoracic formula for *Parheteromastus* Monro, 1937 now falls within the expanded thoracic range of *Mediomastus*. Genetic data will likely be needed to resolve the relationships of these two genera. If the two are found to be synonymous, I believe that *Parheteromastus* would have priority.

Mediomastus acutus Hartman, 1969

See Warren et al. (1994) A revision of the genus *Mediomastus* Hartman, 1944 (Polychaeta: Capitellidae). *Records of the Australian Museum* 46(3): 227-256 or Blake (2000) Family Capitellidae Grube, 1862. pages 47-96. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 7 – The Annelida Part 4 – Polychaeta: Flabelligeridae to Sternaspidae*. Santa Barbara Museum of Natural History for descriptions and images of *Mediomastus acutus*.

Thoracic Formula: $^{(4c+3h+3p)}/_{(4c+6h)}$

Mediomastus ambiseta (Hartman, 1947)

Capitita ambiseta Hartman, 1947 – superseded original combination

See Warren et al. (1994) A revision of the genus *Mediomastus* Hartman, 1944 (Polychaeta: Capitellidae). *Records of the Australian Museum* 46(3): 227-256 or Blake (2000) Family Capitellidae Grube, 1862. pages 47-96. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 7 – The Annelida Part 4 – Polychaeta: Flabelligeridae to Sternaspidae*. Santa Barbara Museum of Natural History for descriptions and images of *Mediomastus ambiseta*.

Thoracic Formula: $^{(4c+6h)}/_{(4c+6h)}$

Mediomastus californiensis Hartman, 1944

See Warren et al. (1994) A revision of the genus *Mediomastus* Hartman, 1944 (Polychaeta: Capitellidae). *Records of the Australian Museum* 46(3): 227-256 or Blake (2000) Family Capitellidae Grube, 1862. pages 47-96. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 7 – The Annelida Part 4 – Polychaeta: Flabelligeridae to Sternaspidae*. Santa Barbara Museum of Natural History for descriptions and images of *Mediomastus californiensis*.

Thoracic Formula: $^{(4c+6h)}/_{(4c+6h)}$

***Mediomastus* sp A** SCAMIT, 2015 §

Mediomastus sp 6 Harris, 2001 §

Description [from Phillips, 2017] Body linear, not threadlike, width in anterior usually around 1 mm. Prostomium a small lobe, palpode present; peristomium achaetous, smooth, truncate. Thorax with 10 chaetigers, biannulate, achaetous segment absent; chaetigers 1-4 with capillary chaetae only, chaetigers 5-10 with hooded hooks. Abdominal chaetigers with hooded hooks. Posterior abdomen and pygidium unknown.

Chaetiger 2 with white pigment band, obvious without staining (Fig. 1)

Methyl Green Staining Pattern [from Phillips, 2017]. Dorsal patch on posterior prostomium and all of peristomium; chaetigers 1-2 non-staining, chaetiger 2 white pigment band obvious; posterior thoracic segments darkly stained; abdominal segments with intersegmental band (Fig. 1)

Thoracic Formula: $^{(4c+6h)}/_{(4c+6h)}$

Habitat & Faunal Associates *Mediomastus* sp A is known to inhabit silty mud in shallow waters.

Distribution Goleta to San Diego Bay, California, USA; 1-30 m.

Remarks [from Phillips, 2017] Three species have been listed from the SCB (SCAMIT Edition 9) *Mediomastus acutus* Hartman 1969, *M. ambiseta* (Hartman 1947) and *M. californiensis* Hartman 1944. *Mediomastus acutus* differs from *M.* sp A in having a long, acute prostomium (see p. 385, Hartman 1969), paddle-like notosetae on setigers 8-10 and is found in shallow (1-15 m) clean, fine sands, whereas *M.* sp A is found in shallow, silty mud. *Mediomastus ambiseta* is a small, thread-like species (width 0.25 - 0.5mm) with a small, conical prostomium and longer, smooth peristomium. There is no white pigment pattern on setiger 2 for *M. ambiseta* and the methyl-green stain pattern is different from *M.* sp A (see Figure 2) with a setigers 1-7 a uniform stain and setiger 8 a solid band. There are strong intersegmental stain bands in the early abdominal setigers. *Mediomastus californiensis* is similar in appearance to *M. ambiseta* in also being a thread-like species, with similar prostomium and peristomium. The posterior setigers do not have single spines replacing the hooded hooks as in *M. ambiseta*. The stain pattern for *M. californiensis* is distinctive in having solid stain bands on setigers 4 and 10. There are weak segmental bands in the early abdominal segments. In most instances the posterior portions of specimens of *Mediomastus* are usually missing in samples analyzed from the SCB. Because of this, the SCAMIT protocal for identification of *Mediomastus* has been to label all specimens as *Mediomastus* sp. With methyl green stain patterns being clearly different for *Mediomastus* sp A., *M. ambiseta* and *M. californiensis,* it should be possible to separate these three species in future monitoring based on stain patterns of the anterior fragments.

***Mediomastus* sp 5** Harris, 2020 §

Remarks This provisional species was collected in 1 meter from San Diego Bay. This species resembles *Mediomastus ambiseta* but differs in the shape and stain pattern of the posterior lobes. Due to these differences, the whole animal is needed to differentiate *M. ambiseta* and *M.* sp 5.

Mediomastus sp 5 San Diego Bay st. CB-ES, R.3, -3 ft., 14 May 2020
Need whole body to distinguish from *M. ambiseta*; difference is shape & stain of posterior lobes
L.Harris, Nov. 2020

Genus *Neomediomastus* Hartman, 1969

Type species: *Neomediomastus glabrus* (Hartman, 1960) as *Mediomastus glabrus*, by monotypy

Diagnosis [emended after Magalhães & Blake, 2020; Green, 2002 and Blake, 2000] *Prostomium short, conical, palpode present or absent; eyespots present or absent; nuchal organs present; peristomium achaetous, clearly distinct from the prostomium. Thorax with 9-10 chaetigers; achaetous segment absent*; chaetiger 1 complete; chaetigers 1-6 with capillary chaetae in both rami; remaining thoracic chaetigers with long-handled hooded hooks. Thorax clearly demarked from the abdomen. Small notopodial processes ("branchiae") may be present in posterior abdominal segments. Genital pores and lateral organs not described. Pygidium unknown.

Thoracic formula: $^{(6c+3(4)h)}/_{(6c+3(4)h)}$

Neomediomastus glabrus (Hartman, 1960)

Mediomastus glabrus Hartman, 1960 – superseded original combination

See Warren et al. (1994) A revision of the genus *Mediomastus* Hartman, 1944 (Polychaeta: Capitellidae). *Records of the Australian Museum* 46(3): 227-256 or Blake (2000) Family Capitellidae Grube, 1862. pages 47-96. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 7 – The Annelida Part 4 – Polychaeta: Flabelligeridae to Sternaspidae*. Santa Barbara Museum of Natural History for descriptions and images of *Neomediomastus glabrus*.

Remarks *Neomediomastus glabrus* is a deep basin animal reported from 900-1749m. This organism is likely to be encountered only during Bight surveys.

Genus *Notodasus* Fauchald, 1972

Dodecaseta McCammon & Stull, 1978. *Fide* García-Garza *et al*., 2017 – subjective synonym

Type species: *Notodasus magnus* Fauchald, 1972, by original designation

Diagnosis [emended after Magalhães & Blake, 2020 and Lin *et al*., 2019] *Prostomium conical, palpode present; eyespots present or absent; peristomium achaetous, clearly distinct from the prostomium*. Thorax with 11

chaetigers; *achaetous segment absent*; first chaetiger complete; thoracic chaetigers with capillary chaetae only in both rami. First 1 or 2 abdominal chaetigers with bilimbate capillary chaetae in both rami, subsequent abdominal chaetigers with hooded hooks only. Branchiae present, retractile, branched, superior to notopodia. Genital pores, when observed, in up to three pairs from chaetigers 8-9. Lateral organs present on thorax and abdomen. Pygidium with or without caudal cirrus.

Thoracic formula: $^{(11c)}/_{(11c)} + {}^{(1(2)c)}/_{(1(2)e(m))}$

Notodasus oraria (McCammon & Stull, 1978)

Dodecaseta oraria McCammon & Stull, 1978 – superseded original combination
Notodasus kristiani García-Garza, Hernández-Valdez & de León-González, 2009 – subjective synonym

See García-Garza et al. (2017) Relocation of *Dodecaseta* McCammon & Stull, 1978 (Annelida, Capitellidae) in *Notodasus* Fauchald, 1972. *ZooKeys* 715: 93-101 for a description and images of *Notodasus oraria*.

Genus *Notomastus* Sars, 1851

Arenia Quatrefages, 1866. *Fide* Hartman, 1959 - unaccepted
Eisigella Gravier, 1901 – subjective synonym
Notomastus (*Clistomastus*) Eisig, 1887 – disused currently
Notomastus (*Tremomastus*) Eisig, 1887. *Fide* Fauvel, 1927 – disused, synonym of Notomastus sensu stricto
Paraleiocapitella Thomassin, 1970. *Fide* Ewing, 1982 – subjective synonym
Sandanis Kinberg, 1867. *Fide* Hartman, 1959 – subjective synonym

Type species: *Notomastus latericeus* Sars, 1851, by monotypy

Diagnosis (emended after Magalhães & Blake, 2020 and Lin *et al*., 2020). Prostomium conical, with or without palpode; eyespots present or absent; peristomium achaetous, clearly distinct from the prostomium. Thorax with 11 chaetigers; *achaetous segment absent*; first chaetiger complete or incomplete; chaetigers 1-10 with capillary chaetae in both rami; chaetiger 11 with capillary chaetae in both rami or with capillary notochaetae and neuropodial hooded hooks. Thorax clearly demarked from abdomen. Abdominal chaetigers with hooded hooks only. Branchiae present or absent. Genital pores present or absent. Lateral organs present on thorax and abdomen. Pygidium without cirri, but unknown for many species.

Thoracic formula: $^{(11c)}/_{(10c+1e)}$ or $^{(11c)}/_{(0+10c)}$ or $^{(11c)}/_{(0+9c+1e)}$

Remarks The emended diagnosis of the genus *Capitellethus* places its thoracic formula in agreement with that of the genus *Notomastus* and similar to that of the genus *Rashgua*. *Capitellethus* differs from *Notomastus* in the dentition of the abdominal hooded hooks, with the basal row having 2 teeth in *Capitellethus* and more than 2 teeth in *Notomastus*. *Rashgua* differs from both genera in mostly lacking abdominal notochaetae. Genetic analysis will likely be needed to resolve the relationships of these three genera.

This interpretation of the genus *Capitellethus* differs slightly from that given in Magalhães & Blake (2020) as they view this genus as having a uniramous first chaetiger.

Rashgua is unique among the capitellids in mostly lacking abdominal notochaetae. This differentiates it from other genera with 11 thoracic chaetigers and capillary notochaetae in all thoracic chaetigers such as *Notomastus* and *Capitellethus*. See also remarks on *Capitellethus* and *Notomastus* for comments on the similarities of the three genera.

Notomastus hemipodus Hartman, 1945

Notomastus (*Clistomastus*) *hemipodus* Hartman, 1945 – disused synonym
Notomastus (*Clistomastus*) *hemipodus* Hartman, 1947 – unaccepted
Notomastus americanus Day, 1973 – subjective synonym
Notomastus sp A SCAMIT, 2001 §
Notomastus tenuis of authors NEP, not Moore, 1909

See García-Garza, M. E., Harris, L. H. & de León-González, J. A. 2012. Redescription of *Notomastus hemipodus* Hartman, 1945 and *N. tenuis* Moore, 1909 (Polychaeta: Capitellidae). *Proceedings of the Biological Society of Washington* 125(1): 1-11 for a description and images of *Notomastus hemipodus*.

Thoracic Formula: $^{(11c)}/_{(0+10c)}$

Notomastus latericeus Sars, 1851

Arenia cruenta Quatrefages, 1866 – subjective synonym
Arenia fragilis Quatrefages, 1866 – subjective synonym
Capitella rubicunda Keferstein, 1862 – subjective synonym
Notomastus rubicundus (Keferstein, 1862) – subjective synonym
Sandanis rubicundus (Keferstein, 1862) – recombination of subjective synonym
Notomastus (*Tremomastus*) *benedeni* Claparède, 1864 – rank variant of subjective synonym
Notomastus benedeni Claparède, 1864 – subjective synonym
Notomastus (*Tremomastus*) *fertilis* Eisig, 1887 – subjective synonym

See Ewing (1984) Family Capitellidae Grube, 1862. Chapter 14. IN: Uebelacker, J. M. & Johnson, P. G. *Taxonomic Guide to the Polychaetes of the Northern Gulf of Mexico. Volume II.* Minerals Management Service, Metairie, Louisiana for the most recent description of *Notomastus latericeus*.

Thoracic Formula: $^{(11c)}/_{(11c)}$

Remarks This species was originally described from either New Brunswick, Canada or Norway and has since gained a cosmopolitan distribution with a depth range of intertidal to 4360m. This is likely a species complex and NEP individuals should be treated as a local provisional species. LACSD has been using *Notomastus* sp LA4 Haggin, 2023 § (described below) for local members of this species complex.

Notomastus lineatus Claparède, 1869

Notomastus (*Clistomastus*) *lineatus* Claparède, 1869 – alternated representation with disused subgenus
Notomastus (*Clistomastus*) *lineatus balanoglossi* Eisig, 1887 – subjective synonym
Notomastus sarsii Claparède, 1864 – subjective synonym

See Ewing (1984) Family Capitellidae Grube, 1862. Chapter 14. IN: Uebelacker, J. M. & Johnson, P. G. *Taxonomic Guide to the Polychaetes of the Northern Gulf of Mexico. Volume II.* Minerals Management Service, Metairie, Louisiana for the most recent description of *Notomastus lineatus*.

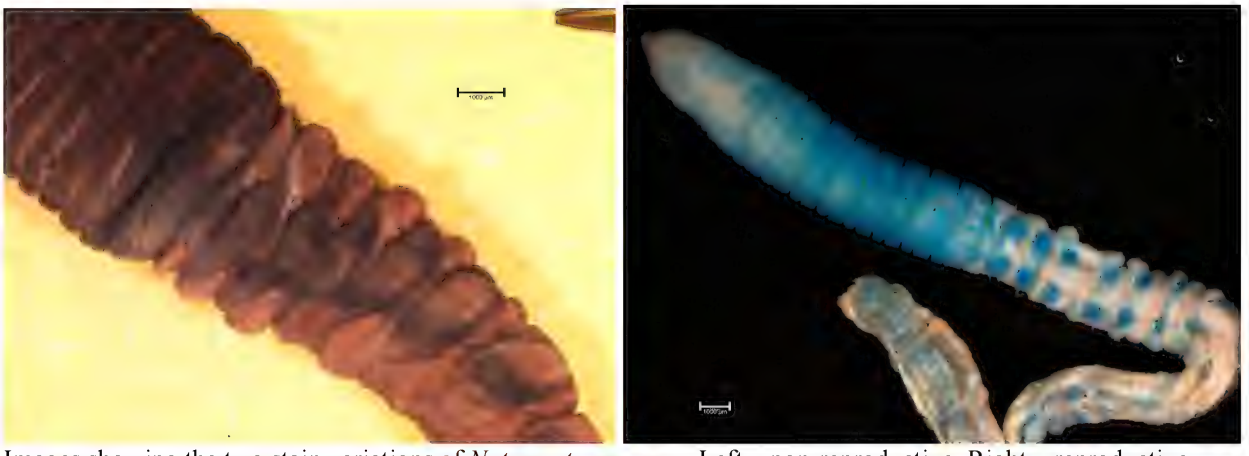
Thoracic Formula: $^{(11c)}/_{(11c)}$

Remarks This species was originally described from Gulf of Naples, Italy and has since gained a cosmopolitan distribution with a depth range of subtidal to 298m. This is likely a species complex and NEP individuals should be treated as a local provisional species. LACSD has been using *Notomastus* sp LA5 Haggin, 2023 § (described below) for local members of this species complex.

Notomastus magnus Hartman, 1947

See Blake (2000) Family Capitellidae Grube, 1862. pages 47-96. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 7 – The Annelida Part 4 – Polychaeta: Flabelligeridae to Sternaspidae*. Santa Barbara Museum of Natural History for the most recent description of *Notomastus magnus*.

Thoracic Formula: $^{(11c)}/_{(11c)}$



Images showing the two stain variations of *Notomastus magnus*. Left – non-reproductive, Right – reproductive. Images by B. Haggin (LACSD)

Notomastus tenuis Moore, 1909

Notomastus hemipodus of authors NEP, not Hartman, 1945

See García-Garza, M. E., Harris, L. H. & de León-González, J. A. 2012. Redescription of *Notomastus hemipodus* Hartman, 1945 and *N. tenuis* Moore, 1909 (Polychaeta: Capitellidae). *Proceedings of the Biological Society of Washington* 125(1): 1-11 for a description and images of *Notomastus tenuis*.

Thoracic Formula: $^{(11c)}/_{(0+10c)}$

Notomastus tenuis showing anterior thoracic chaetal arrangement. Image by B. Haggin (LACSD).

***Notomastus* sp LA3** Haggin, 2023 §

Material Examined: LACM-AHF Poly# 12392 (DISCO ID: 17991) (320m—33.825°N 118.444°W—29AUG19) - 1 individual (incomplete fragment); LACM-AHF Poly# 12394 (DISCO ID: 17993) (320m—33.825°N 118.444°W—29AUG19) - 1 individual (in 3 pieces, complete with caudal regen)

Description Prostomium with palpode present, minute; eyespots not observed; peristomium achaetous. Thorax smooth, not noticeably inflated anteriorly. Thorax with 11 chaetigers; achaetous segment absent; chaetiger 1 biramous; capillary chaetae only in thoracic chaetigers. Thorax demarked from abdomen by change in chaetae. Abdominal chaetigers with hooded hooks only. Branchiae present, palmate, notopodial in nature. Abdomen pinches laterally near branchial insertion, giving the appearance of a dorsal ridge in the posterior abdomen. Anal cirri not observed and pygidial detail unknown due to caudal regeneration. Lateral organs and nephridial pores not observed.

Methyl Green Staining Pattern Thorax stains uniformly. Abdomen with dorso-lateral stain, becoming more dorsal only from branchial insertion. Stain concentrates along the dorsal ridge in the branchial region. Branchiae are unstained, giving the appearance of two unstained spots dorsally on posterior abdominal segments. The abdomen is unstained ventrally.

Thoracic Formula: $^{(11c)}/_{(11c)}$

Habitat & Faunal Associates *Notomastus* sp LA3 is known from 2 individuals from muddy substrates.

Distribution *Notomastus* sp LA3 is known only from the type locality.

Type Locality Redondo Canyon, Santa Monica Bay, Los Angeles, California, USA; 320 m.

Remarks A complete provisional voucher sheet will be created in the future after I am able to get to the museum to photograph the specimens.

***Notomastus* sp LA4** Haggin, 2023 §

Notomastus latericeus of authors NEP, not Sars, 1851

See attached provisional voucher sheet

***Notomastus* sp LA5** Haggin, 2023 §

Notomastus lineatus of authors NEP, not Claparéde, 1869

See attached provisional voucher sheet

***Notomastus* sp E** Harris, 2021 §

Description [from Harris, 2021 §]. Approximately 40 specimens; longest specimen approximately 20 mm long and 1.75 mm wide for 57 chaetigers, incomplete. Prostomium not described, palpode not described; eyespots present, red; peristomium achaetous. Thorax strongly areolated, most specimens with a distinct inflation in chaetigers 1-6. Thorax with 11 chaetigers; achaetous segment absent; chaetiger 1 biramous; capillary chaetae only present in thoracic chaetigers. Thorax clearly demarked from abdomen. Abdominal chaetigers with hooded hooks only, hoods not inflated, main fang surmounted by 1 row of many small teeth. Anterior abdominal notopodia fused into a single mid-dorsal pad; by the 10th abdominal chaetiger, tori are separated with a wide gap between them. Branchiae present, as blood vessels inside abdominal superior neuropodial lobes. Lateral organs present on all chaetigers, simple inconspicuous pits in thorax between notopodia and neuropodia, changing to conspicuous ovoid structure in abdomen. Nephridia (genital pores) present in thorax only, visible as apertures in intersegmental areas between last 3 thoracic chaetigers (8/9 – 9/10 – 10/11).

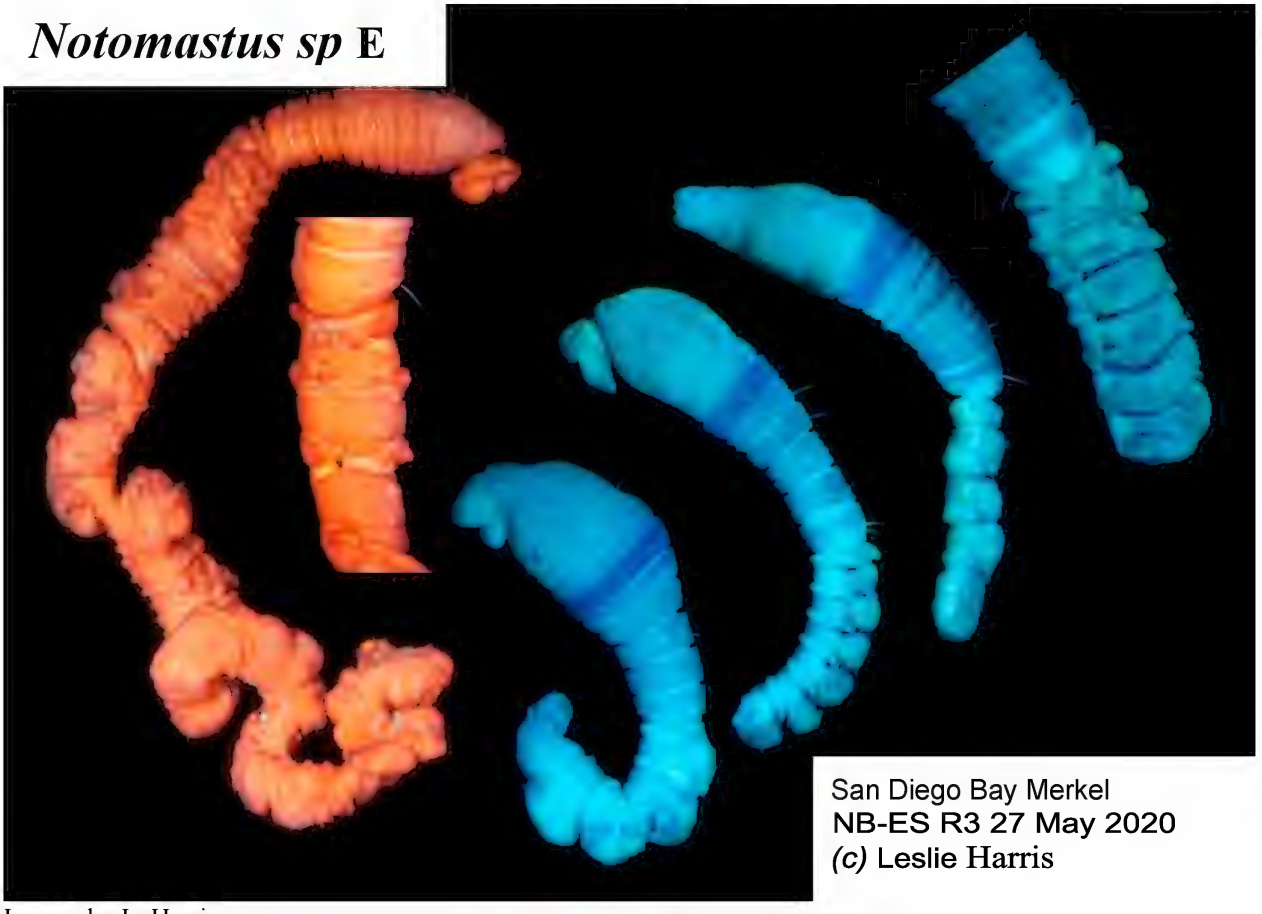
Methyl Green Staining Pattern [from Harris, 2021 §]. Stain pattern distinctive, dark band on chaetiger 6, medium stain on chaetigers 7 thru anterior half of chaetiger 11. Thin dorsal, sometimes lateral as well, bands of dark spots on intersegmental areas of abdominal chaetigers.

Thoracic Formula: $^{(11c)}/_{(11c)}$

Distribution Currently known only from the type locality

Type Locality Northern San Diego Bay, California, USA; 3 m.

Remarks [emended from Harris, 2021 §]. *Notomastus magnus*, *N.* sp LA3, *N.* sp LA4, *N.* sp LA5, *N.* sp SD2, N. sp SD3 and *Scyphoproctus oculatus* all have 11 thoracic chaetigers, a biramous 1st chaetiger and either look similar, *S. oculatus* can have an inflated anterior thorax, or co-occur. *Scyphoproctus oculatus* differs in having a true achaetous segment present in the thorax and a pygidium modified into an anal plaque. *Notomastus* sp E can be distinguished from *Notomastus magnus* and local provisional species *Notomastus* sp LA3, *Notomastus* sp LA4, *Notomastus* sp LA5, *Notomastus* sp SD2 and *Notomastus* sp SD3 by their distinctive stain patterns.



Images by L. Harris

***Notomastus* sp SD2** Rowe, 1999 §

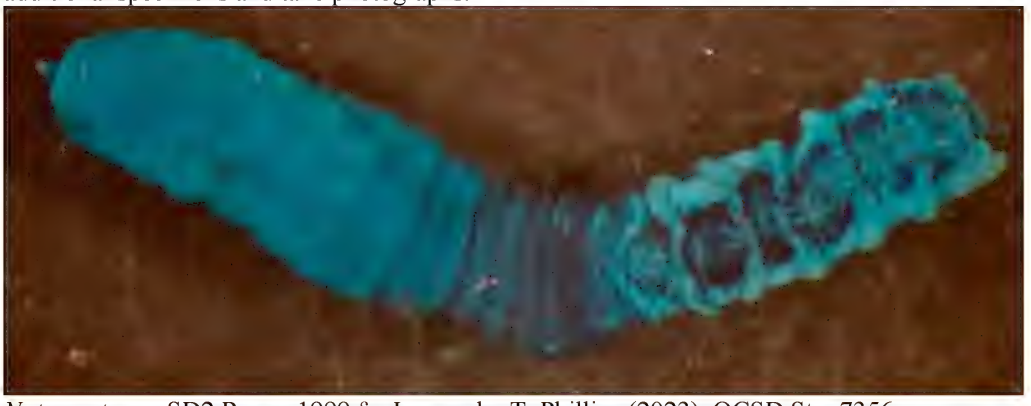
Description Eyes absent. Thoracic epithelium very rugose. Thorax with 11 chaetiger, chaetiger 1 biramous, all thoracic chaetae capillaries. Abdomen with short notopodial tori, neuropodial tori with rounded superior lobe, lateral in position. Abdominal hooded hooks with tightly adhering hood. Nephridial pores difficult to discern, possibly present in last 6 thoracic chaetigers. Branchiae unknown. Pygidium unknown.

Methyl Green Staining Pattern Thorax stains uniformly, becoming slightly darker in last few thoracic chaetigers. Abdominal chaetigers with an encircling stain band anterior to the chaetal fascicle, fading from ventrum by the 6th abdominal chaetiger, dorsally with a postchaetal stain band and a broad prechaetal patch on each abdominal segment (appears as a "U" shape opening to the posterior).

Thoracic Formula: $^{(11c)}/_{(11c)}$

Type Locality southern California, USA; 84m.

Remarks A complete provisional voucher sheet will be created in the future after I am able to review additional specimens and take photographs.



Notomastus sp SD2 Rowe, 1999 § - Images by T. Phillips (2023), OCSD Stn. 7356

***Notomastus* sp SD3** Rowe, 2004 §

Description Prostomium not described. Thorax with 11 chaetiger, chaetiger 1 biramous, all thoracic chaetae capillaries. Abdomen with short notopodial tori, neuropodial tori with long lobe. Abdominal hooded hooks with tightly adhering hood, few in notopodia, numerous in neuropodia. Branchiae unknown. Pygidium unknown.

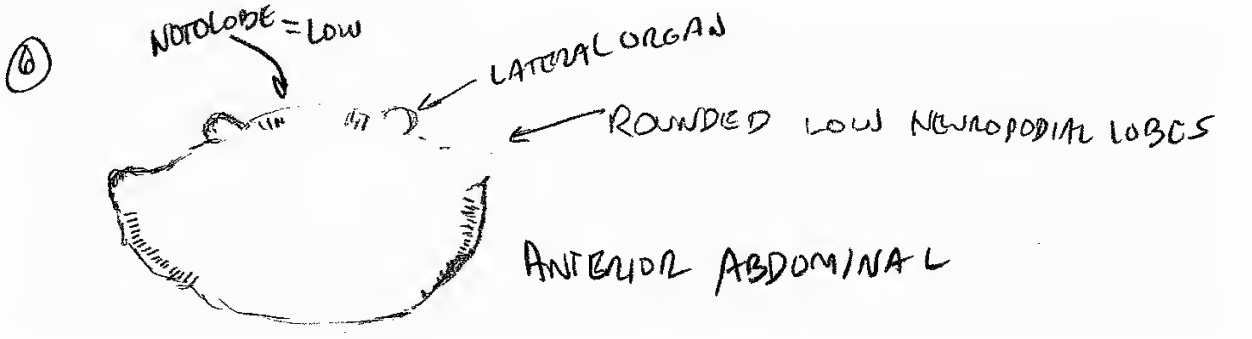
Methyl Green Staining Pattern Thorax stains thru anterior half of chaetiger 10, non-staining band on posterior of chaetiger 10 and anterior of chaetiger 11, staining again on the posterior half of chaetiger 11. First abdominal chaetiger with a prechaetal stain band and a small postchaetal mid-dorsal stain patch. Remaining abdominal chaetigers with a with a prechaetal "U" shaped stain, opening anteriorly, and a small postchaetal mid-dorsal stain patch (appears as a smiling cyclops). Abdomen unstained ventrally.

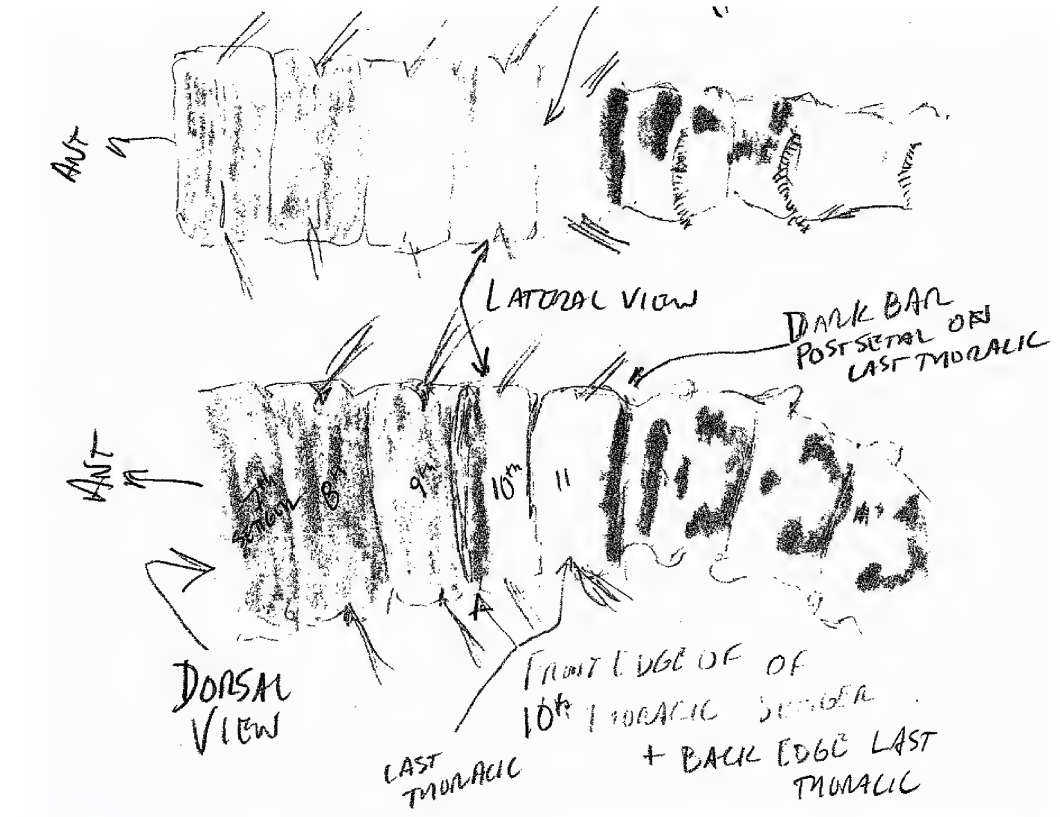
Thoracic Formula: $^{(11c)}/_{(11c)}$

Habitat & Faunal Associates small *Aphelochaeta*, *Questa*, Acrocirridae and Oligochaetes.

Type Locality NE end of Anacapa Island, California, USA; 75m.

Remarks A complete provisional voucher sheet will be created in the future after I am able to review additional specimens and take photographs.





Images scanned from SCAMIT meeting notes, 11JUN2007

***Notomastus* sp SF1** Norris, 2008 §

Notomastus sp D Harris, 2011 §

Description [emended from *Notomastus* sp SF1 voucher sheet, Norris (2008) and *Notomastus* sp D voucher sheet, Harris (2011)] Specimen length to 16mm, incomplete, regenerating posterior segments. Prostomium blunt, palpode present; eyespots present, red. Thorax with 11 chaetigers; achaetous segment absent; chaetiger 1 uniramous, notochaetae only, all thoracic chaetae capillaries. Abdominal chaetigers with hooded hooks only in both rami; hooks with tightly adhering hood and main fang surmounted by secondary teeth in a few rows. Lateral organs and nephridial pores not described. Branchiae unknown. Pygidium unknown.

Methyl Green Staining Pattern Thorax not retaining stain anteriorly, with staining bands from chaetigers 5-9 thru 11. Abdominal chaetigers staining with a continuous, broad dorsal patch thru at least chaetiger 45. Abdomen unstained ventrally.

Thoracic Formula: $^{(11c)}/_{(0+10c)}$

Distribution *Notomastus* sp SF1 has been reported from San Francisco and the LA/LB Harbor Complex near Long Beach from a depth of 4.5m. This species has also been reported from Washington.

Type Locality San Francisco, California, USA

Remarks *Notomastus* sp SF1 is similar to *Notomastus hemipodus* and *Notomastus tenuis* in having a uniramous first chaetiger. These species can be distinguished locally by their unique stain patterns.

Notomastus sp SF1 Norris, 2008 § - Images from Norris, 2008

Genus *Scyphoproctus* Gravier, 1904

Heteromastides Augener, 1914. *Fide* Silva & Amaral, 2019
Pulliella Fauvel, 1929. *Fide* Magalhães & Bailey-Brock, 2012

Type species: *Scyphoproctus djiboutiensis* Gravier, 1904, by original designation

Diagnosis (emended after da Silva & Amaral, 2019). Rounded prostomium without palpode; peristomium achaetous; intersegmental groove between peristomium and achaetous segment may be complete or incomplete. *Thorax with 9-14 chaetigers*; achaetous segment with lateral organ present; *last thoracic chaetiger with capillaries in both rami or with capillary notochaetae and neuropodial hooded hooks, all other thoracic chaetigers with capillary chaetae in both rami*. Abdomen with hooded hooks throughout or with one or more pre-anal chaetigers with acicular spines in the notopodia. Pygidium expanded as a poorly or well-developed anal plaque with a pair of ventral digitiform cirri; with or without a median membrane. Anal plaque with embedded or protruding acicular spines.

Thoracic formula: (-) + $^{(9\text{-}14c)}/_{(8\text{-}13c+1e)}$

Remarks *Scyphoproctus* is unique among the capitellids in being possibly the only genus to posses a true achaetous segment anterior to the first chaetiger (see also remarks on *Pseudonotomastus*). The presence of lateral organs on this segment define it as a true segment, and aids in its diagnosis when the segmental groove between the peristomium and achaetous segment is incomplete. The presence of the anal plaque with acicular spines is another character of the *Scyphoproctus* that is unique among the capitellids. See also remarks on *Mastobranchus*.

Scyphoproctus oculatus Reish, 1959

See da Silva, C. F. & Amaral, A. C. Z. 2019. *Scyphoproctus* Gravier, 1904 (Annelida, Capitellidae): description of three new species and relocation of *Heteromastides* Augener, 1914 in *Scyphoproctus*. *Zootaxa* 4560(1): 95-120 for the most recent description and images of *Scyphoproctus oculatus*.

Remarks Locally, *Scyphoproctus oculatus* is the only capitellid species with a true achaetous segment in the thorax. Combined with the large prostomial eyespots, sometimes obscured by the peristomium, and the modified anal plaque, this species should be fairly easy to identify.

Discussion

Also presented during the SCAMIT meeting was a discussion of the biology of the family Capitellidae and definitions of terms associated with the family Capitellidae. This can be found in the pdf version of the presentation

stored in the toolbox on the SCAMIT website. A couple of keys were also presented during the meeting. The first, *Key to the Genera of the Family Capitellidae*, covers all of the genera of the family globally. The second, *Key to the Family Capitellidae of SCAMIT Ed. 14 and Local Provisional Species*, includes all species discussed during the meeting. Both of these keys have an associated character table and all the files are available in the toolbox on the SCAMIT website. Realizing that the dichotomous key to the genera can be a little confusing by bouncing back and forth between the number of thoracic chaetigers and the number of chaetigers with capillary notochaetae, I have also created a *Tabular Key to the Genera of the Family Capitellidae*. It is included here and will be added to the toolbox as well. Any feedback on the function of the keys is welcome and please let me know if the tabular key is more useful than the dichotomous key to the genera.

References

Amaral, A. C. Z. 1980. Breve caracterização dos gêneros da família Capitellidae Grube (Annelida, Polychaeta) e descrição de *Nonatus longilineus* gen. sp. nov. *Boletim do Instituto Oceanográfico, São Paulo* 29(1): 99-106.

Amoureux, L. 1983. Annélides Polychètes du golfe d'Aqaba (mer Rouge) Description d'un genre nouveau et de deux espèces nouvelles. *Bulletin du Muséum d'Histoire Naturelle, Paris (series 4)* 5(3): 723-742.

Blake, J. A. 1994. Introduction To The Polychaeta. pages 39-113. IN: Blake, J. A. & Hilbig, B. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel 4 – The Annelida Part 1 – Oligochaeta and Polychaeta: Phyllodocida (Phyllodocidae to Paralacydoniidae).* Santa Barbara Museum of Natural History.

Blake, J. A. 2000. Family Capitellidae Grube, 1862. pages 47-96. IN: Blake, J. A., Hilbig, B. & Valentich-Scott, P. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 7 - The Annelida Part 4 - Polychaeta: Flabelligeridae to Sternaspidae*. Santa Barbara Museum of Natural History.

Blake, J. A. 2009. Redescription of *Capitella capitata* (Fabricius) from West Greenland and designation of a neotype (Polychaeta, Capitellidae). *Zoosymposia* 2: 55-80.

Blake, J. A., Grassle, J. P. & Eckelbarger, K. J. 2009. *Capitella teleta*, a new species designation for the opportunistic and experimental *Capitella* sp. I, with a review of the literature for confirmed records. *Zoosymposia* 2: 25-53.

Buzhinskaja, G. N. & Smirnov, R. V. 2000. *Abyssocapitella commensalis* gen. et sp. n. associated with the Deep-sea Pogonophore *Spirobrachia leospira* Gureeva, 1975 (Polychaeta: Capitellidae). *Ophelia* 52(3): 171-176.

Capaccioni-Azzati, R. & Martín, D. 1992. *Pseudomastus deltaicus* gen. et sp. n. (Polychaeta: Capitellidae) from a shallow water bay in the North-Western Mediterranean Sea. *Zoologica Scripta* 21(3): 247-250.

Chamberlin, R. V. 1919. The Annelida Polychaeta [Albatross Expeditions]. *Memoirs of the Museum of Comparative Zoology at Harvard College* 48: 1-514.

Choi, H. K. & Yoon, S. M. 2016. First record of *Heteromastus filiformis* (Polychaeta: Capitellidae) from Korean waters, with a taxonomic note on the genus. *Journal of Species Research* 5(3): 264-271.

Çinar, M. E., Dağli, E. & Erdoğan-Dereli, D. 2022. The diversity of polychaetes (Annelida: Polychaeta) in a long-term pollution monitoring study from the Levantine coast of Turkey (Eastern Mediterranean), with the descriptions of four species new to science and two new to the Mediterranean fauna. *Journal of Natural History* 55(33-36): 1383-1426.

Claparède, É. 1870. Les Annélides Chétopodes du Golfe de Naples. Supplément. *Mémoires de la Société de physique et d'histoire naturelle de Genève* 20(2): 365-542.

da Silva, C. F. & Amaral, A. C. Z. 2019. *Scyphoproctus* Gravier, 1904 (Annelida, Capitellidae): description of three new species and relocation of *Heteromastides* Augener, 1914 in *Scyphoproctus*. *Zootaxa* 4560(1): 95-120.

da Silva, C. F. & Amaral, A. C. Z. 2020. Redescription of *Leiocapitella atlantica* Hartman, 1965 and description of a new species from the Southeast Brazil (Annelida, Capitellidae). *Zootaxa* 4767(4): 518-530.

da Silva, C. F. & Amaral, A. C. Z. 2022. Capitellidae (Annelida) from the Brazilian Continental Margin (SW Atlantic): new occurrences of three genera and description of new species. *Zootaxa* 5104(1): 89-110.

Day, J. H. 1967. *[Sedentaria] A monograph on the Polychaeta of Southern Africa. Part 2. Sedentaria.* British Museum (Natural History), London. pp. 459-842.

Ehlers, E. 1908. Die bodensässigen Anneliden aus den Sammlungen der deutschen Tiefsee-Expedition. 1-168. IN: Chun, C. *Wissenschaftliche Ergebnisse der Deutschen Tiefsee-Expedition auf dem Dampfer "Valdivia" 1898-1899* 16(1): 1-168, plates I-XXIII.

Eisig, H. 1887. Monographie der Capitelliden des Golfes Von Neapel und der Angrenzenden Meeres-Abschnitte nebst Untersuchengen zur Vergleichenden Anatomie und Physiologie. *Fauna und Flora des Golfes von Neapel und der Angrenzenden Meeres-Abschnitte* 16(XXVI): 906pp.

Ewing, R. M. 1982. A partial revision of the genus *Notomastus* (Polychaeta: Capitellidae) with a description of a new species from the Gulf of Mexico. *Proceedings of the Biological Society of Washington* 95(2): 232-237.

Ewing, R. M. 1984. Generic revision of *Mastobranchus* and *Peresiella* (Polychaeta: Capitellidae) with descriptions of two new species from the Gulf of Mexico and Atlantic Ocean. *Proceedings of the Biological Society of Washington* 97(4): 792-800.

Ewing, R. M. 1984. Family Capitellidae Grube, 1862. Chapter 14. IN: Uebelacker, J. M. & Johnson, P. G. *Taxonomic Guide to the Polychaetes of the Northern Gulf of Mexico. Volume II*. Minerals Management Service, Metairie, Louisiana.

Fauchald, K. 1972. Benthic polychaetous annelids from deep water off western Mexico and adjacent areas in the Eastern Pacific Ocean. *Allan Hancock Monographs in Marine Biology* 7: 1-575.

Fauchald, K. 1977. The polychaete worms, definitions and keys to the orders, families and genera. *Natural History Museum of Los Angeles County: Los Angeles, CA (USA), Science Series* 28: 1-188.

Fauchald, K. & Hancock, D. R. 1981. Deep-water polychaetes from a transect off central Oregon. *Allan Hancock Monographs in Marine Biology* 11: 1-73.

Fauvel, P. 1913. Quatrième note préliminaire sur les Polychètes proveneant des campagnées de l'Hirondelle et de la Princesse-Alice, ou deposes dans le Musée Océanographique de Monaco. *Bulletin de l'Institut Océanographique de Monaco* 270: 1-80.

García-Garza, M. E. & de León-González, J. A. 2009. A new species of *Dasybranchethus* (Annelida: Capitellidae) from Mexican Pacific, with a redescription of *Dasybranchethus fauveli*. *Journal of the Marine Biological Association of the United Kingdom* 89(7): 1437-1441.

García-Garza, M. E. & de León-González, J. A. 2011. Review of Capitellidae (Annelida, Polychaeta) from the Eastern Tropical Pacific region, with notes on selected species. *ZooKeys* 151: 17-52.

Garciá-Garza, M. E. & de León-González, J. A. 2015. The genus *Notomastus* (Polychaeta: Capitellidae) in the Gulf of California, Mexico, with the description of three new species. *Proceedings of the Biological Society of Washington* 128(2): 176-189.

García-Garza, M. E., de León-González, J. A. & Harris, L. H. 2017. Relocation of *Dodecaseta* McCammon & Stull, 1978 (Annelida, Capitellidae) in *Notodasus* Fauchald, 1972. *ZooKeys* 715: 93-101.

García-Garza, M. E., de León-González, J. A. & Tovar-Hernández, M. A. 2019. Catalogue of *Notomastus* M. Sars, 1851 (Annelida, Capitellidae) and the description of a new species from the Gulf of California. *Zootaxa* 4577(2): 249-273.

García-Garza, M. E., Harris, L. H. & de León-González, J. A. 2012. Redescription of *Notomastus hemipodus* Hartman, 1945 and *N. tenuis* Moore, 1909 (Polychaeta: Capitellidae). *Proceedings of the Biological Society of Washington* 125(1): 1-11.

García-Garza, M. E., Hernández-Valdez, V. D. & de León-González, J. A. 2009. Generic revision of *Notodasus* Fauchald, 1972 (Polychaeta: Capitellidae) with descriptions of four new species from the coasts of Mexico. *Scientia Marina* 73(4): 809-823.

Gravier, C. 1904. Sur un type nouveau de la famille des Capitelliens: *Scyphoproctus* nov. gen., *djiboutiensis* nov. sp. *Bulletin du Muséum d'Histoire Natureele, Paris* 10: 557-561.

Green, K. D. 2002. Capitellidae (Polychaeta) from the Andaman Sea. *Phuket Marine Biological Center Special Publication* 24: 249-343.

Harmelin, J.-G. 1964. Etude de l'endofaune des "mattes" d'herbiers de *Posidonia oceanica* Delile [Research on the endofauna of *Posidonia oceanica* Delile mats]. *Recueil des Travaux de la Station Marine d'Endoume* 35(51): 43-105.

Harmelin, J.-G. 1968. Note sur trois Capitellidae (Annélides Polychètes) récoltés en Méditerranée, avec description d'un nouveau genre: *Peresiella*. *Recueil des Travaux de la Station Marine d' Endoume* 43(59): 253-259.

Harris, L. H. 2021. *Notomastus* sp E Harris 2021 § & comparisons to NEP *N. latericeus* & NEP *N. lineatus*, *N. magnus* & *Scyphoproctus oc*ulatus. *SCAMIT Handout*.

Hartman, O. 1944. Polychaetous annelids from California, including the descriptions of two new genera and nine new species. *Allan Hancock Pacific Expeditions* 10(2): 239-307.

Hartman, O. 1947. Polychaetous Annelids. Part VII. Capitellidae. *Allan Hancock Pacific Expeditions* 10(4): 391-481.

Hartman, O. 1959. Catalogue of the Polychaetous Annelids of the World. Parts 1 and 2. *Allan Hancock Foundation Occasional Paper* 23: 1-628.

Hartman, O. 1960. Systematic account of some marine invertebrate animals from the deep basins off southern California. *Allan Hancock Pacific Expeditions* 22(2): 69-216.

Hartman, O. 1963. Submarine canyons of southern California. Part III. Systematics: Polychaetes. *Allan Hancock Pacific Expeditions* 27(3): 1-93.

Hartman, O. 1969. *Atlas of the sedentariate polychaetous annelids from California*. 1-812. Allan Hancock Foundation, University of Southern California. Los Angeles.

Hartmann-Schröder, G. 1960. Polychaeten aus dem Roten Meer. *Kieler Meeresforschungen* 16(1): 69-125.

Hartmann-Schröder, G. 1962. Zweiter Beitrag zur Polychaetenfauna von Peru. *Kieler Meeresforschungen* 18(1): 109-147.

Hernández-Alcántara, P., Solís-Weiss, V. & Garciá-Garza, M. E. 2019. A new species of *Decamastus* Hartman, 1963 (Polychaeta: Capitellidae) from the Gulf of California, with remarks on its habitat. *Marine Biodiversity* 49(3): 1123-1130.

Hutchings, P. A. & Rainer, S. 1982. Designation of a neotype of *Capitella filiformis* Claparède, 1964, type species of the genus *Heteromastus* (Polychaeta: Capitellidae). *Records of the Australian Museum* 34(4): 373-380.

Jeong, M-K., Soh, H. Y., Wi, J. H. & Suh, H-L. 2018. A new *Notomastus* (Annelida, Capitellidae) species from Korean waters, with genetic comparison based on three gene markers. *ZooKeys* 754: 141-155.

Jeong, M-K., Wi, J. H. & Suh, H-L. 2017. A new species of *Leiochrides* from Korean subtidal waters with notes on the taxonomic status of the genus *Pseudomastus* (Annelida, Capitellidae). *ZooKeys* 685: 91-103.

Jones, M. L. 1961. Two new polychaetes of the families Pilargidae and Capitellidae from the Gulf of Mexico. *American Museum Novitates* 2049: 1-18.

Lin, J., Garciá-Garza, M. E., Arbi, U. Y. & Wang, J. 2019. Two new species of *Notodasus* Fauchald, 1972 (Annelida: Capitellidae) from the Central Indo-Pacific region. *PeerJ* 7(e7638): 1-25.

Lin, J., Garciá-Garza, M. E. & Wang, J. 2019. First record of the genus *Leiocapitella* (Annelida: Capitellidae) from China with description of a new species. *Zootaxa* 4604(1): 191-196.

Lin, J-H., Garciá-Garza, M. E., Lyu, M-X. & Wang, J-J. 2020. A new species of *Notomastus* (Annelida, Capitellidae) from southern China, with remarks on its morphology and distribution. *ZooKeys* 946: 1-16.

López, E., Capa, M., Aguado, M. T. & Cladera, P. 2005. Capitellidae (Annelida: Polychaeta) from Coiba National Park, Pacific Coast of Panamá, with a new species of the genus *Amastigos*. *Cahiers de Biologie Marine* 46: 57-67.

Magalhães, W. F. & Bailey-Brock, J. H. 2012. Capitellidae Grube, 1862 (Annelida: Polychaeta) from the Hawaiian Islands with descriptions of two new species. *Zootaxa* 3581: 1-52.

Magalhães, W. F. & Blake, J. A. 2020. 7.6.4 Capitellidae Grube, 1862. pp. 349–403, *In*: Purschke, G., Böggemann, M. & Westheide, W. (Eds.), *Handbook of Zoology*. *Annelida*, 2 (Pleistoannelida, Sedentaria II), pp. 1–465.

McCammon, J. A. & Stull, J. K. 1978. A new genus and species of Capitellidae (Polychaeta) from California. *Bulletin. Southern California Academy of Sciences* 77(1): 40-43.

McIntosh, W. C. 1885. Report on Annelida Polychaeta collected by H.M.S. Challenger during the years 1873-1876. *Reports of the Scientific Results of the Voyage of the Challenger, Zoology* 12: 1-554.

Monro, C. C. A. 1931. Polychaeta, Oligochaeta, Echiuroidea, and Sipunculoidea. *Scientific Reports of the Great Barrier Reef Expedition 1928-29, British Museum (Natural History)* 4(1): 1-37.

Moore, J. P. 1909. Polychaetous annelids from Monterey Bay and San Diego, California. *Proceedings of the Academy of Natural Sciences of Philadelphia* 61: 235-295, plates VII-IX.

Norris, D. 2008. *Notomastus* sp SF1 voucher sheet. *SCAMIT Handout*.

Pamungkas, J. 2017. *Capitella ambonensis*: a new polychaete species (Annelida: Capitellidae) collected from a mangrove habitat on Ambon Island, Indonesia. *Zootaxa* 4227(4): 573-582.

Pasko, D. 1991. Genera of Capitellidae Recorded off southern California: Arranged in Order of Increasing Number of Thoracic Segments. *SCAMIT Handout*.

Pasko, D. 1994. *Notomastus lineatus* voucher sheet. *SCAMIT Handout*.

Phillips, T. 2017. *Mediomastus* sp A voucher sheet. *SCAMIT Handout*.

Piltz, F. M. 1977. A New Genus and Species of Polychaete (Family Capitellidae) from Southern California. *Bulletin of the Southern California Academy of Sciences* 76(1): 57-60.

Read, G. & Fauchald, K. (Ed.) 2022. World Polychaeta Database. *Abyssocapitella commensalis* Buzhinskaja & Smirnov, 2000. Accessed through: World Register of Marine Species at: https://www.marinespecies.org/aphia.php?p=taxdetails&id=326197 on 2022-05-23.

Reish, D. J. 1959. A New Species of Polychaetous Annelid (Family Capitellidae) from Southern California. *Pacific Science* 13: 78-80.

Rowe, R. 1995. *Notomastus l*atericeus voucher sheet. *City of San Diego Voucher Sheet*.

Rullier, F. & Amoureux, L. 1979. Campagne de la Calypso au large des côtes Atlantiques de l'Amérique du Sud I. 33. Annélides Polychètes. *Annales de l'Institut océanographique (Nouv. Ser.)* 55: 145-206.

SCAMIT. 2023. *A Taxonomic Listing of Benthic Macro- and Megainvertebrates from Infaunal & Epifaunal Monitoring and Research Programs in the Southern California Bight, Edition 14*. Southern California Association of Marine Invertebrate Taxonomists. Cadien, D. B., Barwick, K. L. & Haggin, B. M. eds. xxv + 200pp. (July 1, 2023).

Silva, C. F., Seixas, V. C., Barroso, R., Di Domenico, M., Amaral, A. C. Z. & Paiva, P. C. 2017. Demystifying the *Capitella capitata* complex (Annelida, Capitellidae) diversity by morphological and molecular data along the Brazilian coast. *PLoS ONE* 12(5): e0177760. https://doi.org/10.1371/journal.pone.0177760

Silva, C. F., Shimabukuro, M., Alfaro-Lucas, J. M., Fujiwara, Y., Sumida, P. Y. G. & Amaral, A. C. Z. 2016. A new *Capitella* polychaete worm (Annelida: Capitellidae) living inside whale bones in the abyssal South Atlantic. *Deep-Sea Research I* 108: 23-31.

Southern, R. 1921. Polychaeta of the Chilka Lake and also of Fresh and Brackish Waters in other Parts of India. *Memoirs of the Indian Museum* 5(8): 563-659, plates XIX-XXXI.

Tomioka, S., Kakui, K. & Kajihara, H. 2018. Molecular Phylogeny of the Family Capitellidae (Annelida). *Zoological Science* 35: 436-445.

Tomioka, S., Nishi, E. & Kajihara, H. 2014. Two new species of *Mediomastus* (Annelida, Capitellidae) from Tokyo Bay, Japan. *ZooKeys* 422: 115-126.

Warren, L. M. 1976a. A Population Study of the Polychaete *Capitella capitata* at Plymouth. *Marine Biology* 38: 209-216.

Warren, L. M. 1976b. A review of the genus *Capitella* (Polychaeta Capitellidae). *Journal of the Zoological Society of London* 180: 195-209.

Warren, L. M., Hutchings, P. A. & Doyle, S. 1994. A revision of the genus *Mediomastus* Hartman, 1944 (Polychaeta: Capitellidae). *Records of the Australian Museum* 46(3): 227-256.

Warren, L. M. & Parker, M. 1994. *Pseudonotomastus southerni* gen. nov. sp. nov., a new capitellid from the Celtic Sea. In: J.-C. Dauvin, L. Laubier & D. J. Reish (Eds). *Actes de la 4ème Conférence international des Polychètes. Mémoires du Muséum National d'Histoire Naturelle, Zoologie* 162: 299-306.

Williams, S. & Hamilton, S. 1985. Capitellidae voucher sheets. *SCAMIT Newsletter* 3(11): 7-20.

Tabular Key to the Genera of the Family Capitellidae

Revised based on B. Haggin 2023 Capitellidae review & presentation

# of segments w/ Capillary Notochaetae	# of Thoracic chaetigers											
	4	8	9	10	11	12	13	14	15	17	18	20
0		Amastigos	Baldia									
2				Undecimastus								
3					Peresiella							
4	Abyssocapitella		Capitella Mediomastus	Mediomastus	Mediomastus Parheteromastus							
5	Abyssocapitella		Capitella		Heteromastus							
6			Capitella Neomediomastus	Neomediomastus Parheteromastides	Barantolla							
7			Capitella		Barantolla							
8		Octocapitella			Neoheteromastus							
9			Leiocapitellides Scyphoproctus (+)									
10				Decamastus Pseudonotomastus (+) Scyphoproctus (+)		Dodecamastus						
11					Capitellethus Notomastus Rashgua Neopseudocapitella Scyphoproctus (+)							
12				Neonotomastus	Neopseudocapitella	Pseudoleiocapitella Leiochrides Promastobranchus Scyphoproctus (+)	Promastobranchus					
13					Notodasus Polymastigos Neopseudocapitella	Promastobranchus	Promastobranchus Leiochrus Dasybranchus Nonatus Leiocapitella Scyphoproctus (+)					
14					Polymastigos Neopseudocapitella	Promastobranchus	Promastobranchus	Leiocapitella Scyphoproctus (+)				
15					Polymastigos Neopseudocapitella	Promastobranchus	Promastobranchus		Dasybranchethus			
16					Polymastigos Neopseudocapitella	Promastobranchus	Promastobranchus					
17					Polymastigos Neopseudocapitella	Promastobranchus	Promastobranchus			Pseudocapitella Anotomastus		
18					Polymastigos Neopseudocapitella	Promastobranchus	Promastobranchus				Anotomastus Capitobranchus	
19					Polymastigos Neopseudocapitella	Promastobranchus	Promastobranchus					
20					Polymastigos Neopseudocapitella Mastobranchus	Promastobranchus	Promastobranchus					Eunotomastus Lumbricomastus
21					Polymastigos Neopseudocapitella Mastobranchus	Promastobranchus	Promastobranchus					
22					Polymastigos Neopseudocapitella Mastobranchus	Promastobranchus	Promastobranchus				Paracapitella	

SCAMIT Newsletter
Vol. 42 No. 3-4

Voucher Sheet

B. Haggin
June, 2024

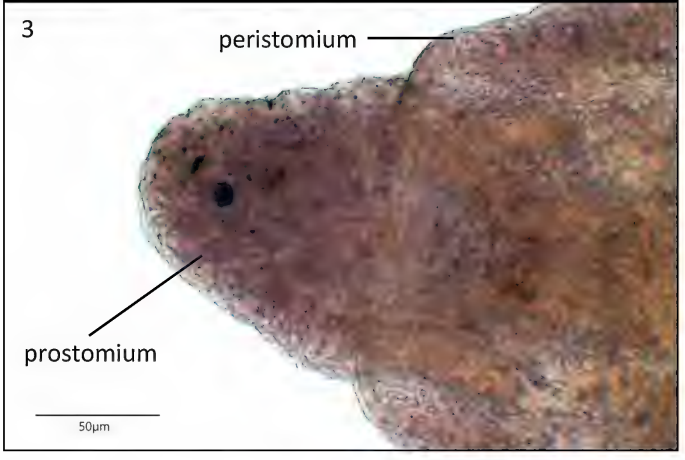
Species: *Capitella* sp LA3 Haggin, 2023 §
P-code—P103
Synonyms: *Capitella capitata* Cmplx of authors SCB, in part
Capitella sp LA1 Parker, 1994 §, in part
ITI-code—Group 4

Family: Capitellidae
Order:
Infraclass: Scolecida
Subclass: Sedentaria
Class: Polychaeta
Phylum: Annelida

Diagnostic Characters:

1) Prostomium conical, rounded, slightly compressed dorsoventrally; eyes absent **(images 1 - 3)**.
2) Thorax with 4 chaetigers with capillary notochaetae **(images 4 & 5)**.
3) Thoracic Formula - $^{(4c+3h+2g)}/_{(4c+5h)}$ ♂ + ♀; $^{(4c+4h+1g)}/_{(4c+5h)}$ or $^{(4c+5h)}/_{(4c+5h)}$ Juveniles

4) Genital spines present in chaetigers 8 & 9. 3 pairs max in each chaetiger **(images 6 & 7)**.
5) Juveniles with genital spines undeveloped. Genital spines appear to develop with age, developing first in chaetiger 9, then in chaetiger 8.
6) Thoracic hooded hooks with 2 small teeth surmounting main fang **(image 8)**.
7) Abdominal hooded hooks with 2 rows of small teeth over main fang; 2 teeth in upper row, 2-3 teeth in lower row **(image 9)**.
8) Branchiae not observed.
9) Pygidium a terminal ring; anal cirri absent **(image 10)**.



Pigmentation/MGS:

1) Not retaining stain, or
2) Slight retention on prostomium.
3) Light speckling on chaetigers 1-4 **(image 11)**.
4) Slight stain retention in chaetigers 5 & 6 as segmental bands **(images 1, 2 & 11)**.
5) Broad lateral stain patch in chaetigers 7 & 8, post chaetal only in chaetiger 7 **(images 1, 2 & 11)**.
6) Chaetiger 9 and anterior abdomen with speckled postchaetal stain band.

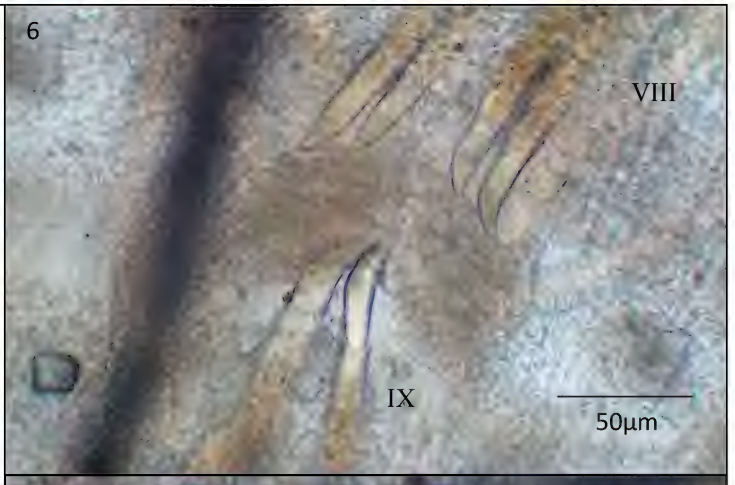
Capitella sp LA3

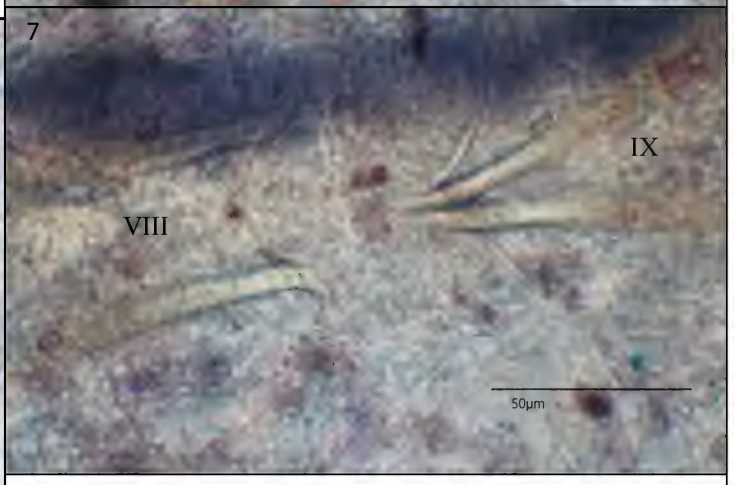
Haggin, 2023 §

Voucher Sheet

B. Haggin

June, 2024





Material Examined:

LACSD stations: 0715-9D (31 m—33.69963N, 118.31345W—08JUL15) - 1 individual; 0717-1B (151 m—33.74940N, 118.44653W—31JUL17) - 1 individual; 0722-1D (31 m—33.76506N, 118.43539W—12JUL22) - 6 individuals; 0722-2B (156 m—33.73228N, 118.42602W—12JUL22) - 1 individual; 0722-4B (150 m—33.71684N, 118.38760W—13JUL22) - 2 individuals; 0722-8D (31 m—33.70682N, 118.32994W—13JUL22) - 13 individuals **(images 1 & 2)**; 0722-9B (154 m—33.68150N, 118.32222W—11JUL22) - 1 individual; 0723-1B (152m—33.74944N, 118.44666W—10JUL23) - 1 individual; 0723-3B (149m—33.72396N, 118.40733W—06JUL23) - 2 individuals; 0723-3D (33m—33.73310N, 118.40060W—11JUL23) - 1 individual; 0723-4D (30m—33.73201N, 118.38047W—10JUL23) - 2 individuals; 0723-6D (31m—33.71607N, 118.34822W—07JUL23) - 17 individuals **(images 3-10)**; 0723-7D (30m—33.71273N., 118.34353W—07JUL23) - 9 individuals; 0723-9C (60m—33.68872N, 118.31818W—07JUL23) - 4 individuals; 0723-9D (30m—33.69961N, 118.31289W—07JUL23) - 5 individuals

SCBPP stations: PSCBE 01500 (77 m—34.40588N, 120.40885W—18AUG94) - 1 individual; PSCBE 03710 (57 m—34.33517N, 119.64275W—17AUG94) - 1 individual **(image 11)**; PLABE 13400 (43 m—33.64092N, 118.23883W—15JUL94) - 1 individual

Capitella sp LA3

Haggin, 2023 §

Voucher Sheet
B. Haggin
June, 2024

Similar Species:

Capitella capitata (Fabricius, 1780), redescribed by Blake (2009)—This species has had its range restricted to western Greenland and is not found locally. *Capitella capitata* has 7 chaetigers with capillary notochaetae, thoracic formula: ♂ + ♀ $^{(7c+2g)}/_{(7c+2e)}$. *Capitella* sp LA3 has only 4 chaetigers with capillary notochaetae.

Capitella capitata oculata Hartman, 1961—This species has black eyes present and 7 chaetigers with capillary notochaetae, thoracic formula: ♂ $^{(7c+2g)}/_{(7c+2h)}$ & ♀ $^{(7c+2h)}/_{(7c+2h)}$. *Capitella* sp LA3 lacks eyes and has only 4 chaetigers with capillary notochaetae.

Capitella capitata tripartita Hartman, 1961—This species has small lateral eyespots and 6 or 7 chaetigers with capillary notochaetae, thoracic formula: ♂ $^{(3c+1c(m)+2m+1m(h)+2g)}/_{(3c+2m+2m(h)+2h)}$ & ♀ $^{(3c+1c(m)+2m+1m(h)+2h)}/_{(3c+2m+2m(h)+2h)}$. *Capitella* sp LA3 lacks eyespots and has only 4 chaetigers with capillary notochaetae.

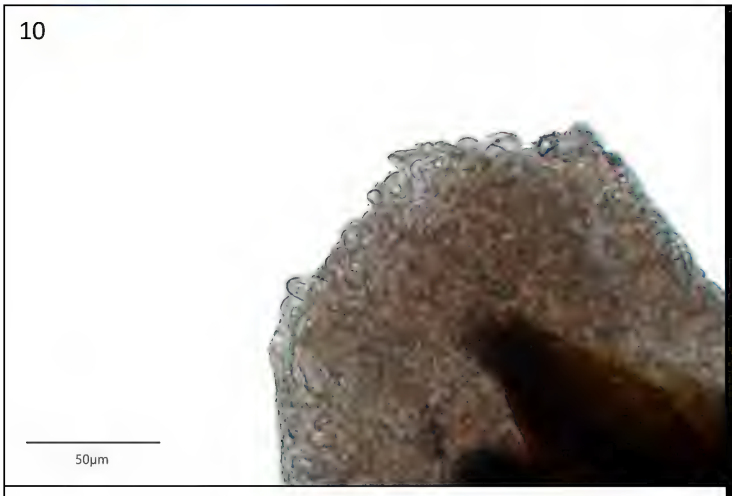
Capitella ovincola Hartman, 1947—This species has 7 chaetigers with capillary notochaetae, thoracic formula: ♂ $^{(5c+2c(m)+2g)}/_{(4c+3c(m)+2h)}$ & ♀ $^{(5c+2c(m)+2h)}/_{(4c+3c(m)+2h)}$. *Capitella* sp LA3 has only 4 chaetigers with capillary notochaetae.

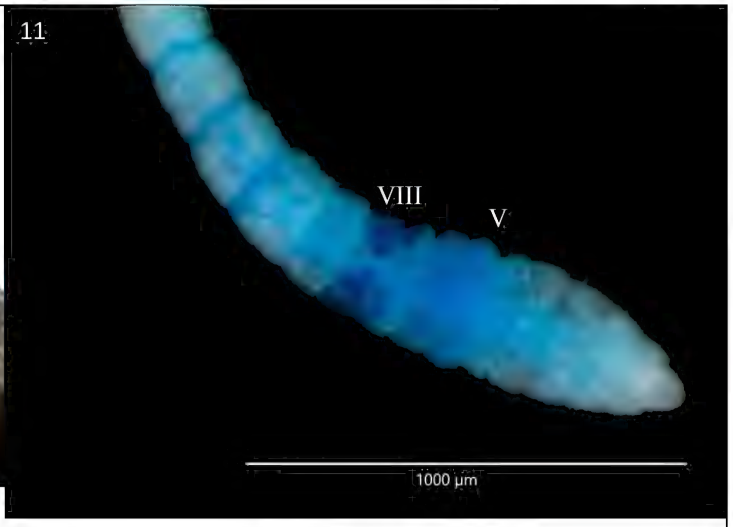
Capitella teleta Blake, Grassle & Eckelbarger, 2009—This species was originally described from a laboratory culture from Woods Hole, Massachusetts. *Capitella teleta* has red eyes present and 7 chaetigers with capillary notochaetae, thoracic formula: ♂ $^{(7c+2g)}/_{(7c+2h)}$ & ♀ $^{(7c+2h)}/_{(7c+2h)}$. *Capitella* sp LA3 lacks eyes and has only 4 chaetigers with capillary notochaetae.

Capitella sp LA3

Haggin, 2023 §

Voucher Sheet
B. Haggin
June, 2024





Discussion:

Capitella capitata (Fabricius, 1780) was originally described from western Greenland and subsequently gained a cosmopolitan distribution in the literature. Blake (2009) designated a neotype and redescribed *Capitella capitata* using new material from the type locality and restricted the range of *C. capitata* to western Greenland. This redescription was very robust and allows for the separation of local specimens previously identified as *Capitella capitata* Cmplx. As of the publication of Blake (2009), 12 to 13 biologically distinct sibling species of the *Capitella capitata* Cmplx have been identified in laboratory culture, and the previous concepts of *Capitella capitata* based on the works of Eisig (1887), Hartman (1947) and Warren (1976) refer to other species that differ significantly from the Greenland specimens (Blake, 2009).

A review of LACSD collections of *Capitella capitata* Cmplx has yielded 1 new provisional species so far, *Capitella* sp LA3 Haggin, 2023 §. Images of staining variation suggests that there may be at least 2 additional cryptic species hiding within the *C. capitata* Cmplx locally. ITI– and P-code values were inherited from *Capitella capitata* Cmplx as this is how it would have been identified historically.

Habitat:

Capitella sp LA3 is currently known only from the Palos Verdes Peninsula from depths of 30-156m. This range could expand farther across southern California as local reviews of *Capitella capitata* Cmplx occur. *Capitella* sp LA3 has been collected in samples with many of the common shelf species from the Palos Verdes Peninsula, but a review of LACSD specimens has yet to find it co-occurring with any other *Capitella spp.* This finding may change as local reviews of the complex continue to occur.

References:

Blake, J. A. 2000. Family Capitellidae Grube, 1862. pages 47-96. IN: Blake, J. A., Hilbig, B. & Valentich-Scott, P. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 7 - The Annelida Part 4 - Polychaeta: Flabelligeridae to Sternaspidae*. Santa Barbara Museum of Natural History.

Blake, J. A. 2009. Redescription of *Capitella capitata* (Fabricius) from West Greenland and designation of a neotype (Polychaeta, Capitellidae). *Zoosymposia* 2: 55-80.

References cont.:

Blake, J. A., Grassle, J. P. & Eckelbarger, K. J. 2009. *Capitella teleta*, a new species designation for the opportunistic and experimental *Capitella* sp. I, with a review of the literature for confirmed records. *Zoosymposia* 2: 25-53.

Eisig, H. 1887. Monographie der Capitelliden des Golfes Von Neapel und der Angrenzenden Meeres-Abschnitte nebst Untersuchengen zur Vergleichenden Anatomie und Physiologie. *Fauna und Flora des Golfes von Neapel und der Angrenzenden Meeres-Abschnitte* 16(XXVI): 906pp.

Hartman, O. 1947. Polychaetous Annelids. Part VII. Capitellidae. *Allan Hancock Pacific Expeditions* 10(4): 391-481.

Hartman, O. 1961. Polychaetous Annelids from California. *Allan Hancock Pacific Expeditions* 25: 1-224.

Warren, L. M. 1976. A review of the genus *Capitella* (Polychaeta Capitellidae). *Journal of the Zoological Society of London* 180: 195-209.

Other Literature Consulted:

Fauchald, K. 1977. The polychaete worms, definitions and keys to the orders, families and genera. *Natural History Museum of Los Angeles County: Los Angeles, CA (USA), Science Series* 28: 1-188.

Hartman, O. 1969. *Atlas of the sedentariate polychaetous annelids from California*. 1-812. Allan Hancock Foundation, University of Southern California. Los Angeles.

Magalhães, W. F. & Blake, J. A. 2020. 7.6.4 Capitellidae Grube, 1862. pp. 349–403, *In*: Purschke, G., Böggemann, M. & Westheide, W. (Eds.), *Handbook of Zoology*. *Annelida*, 2 (Pleistoannelida, Sedentaria II), pp. 1–465.

Pamungkas, J. 2017. *Capitella ambonensis*: a new polychaete species (Annelida: Capitellidae) collected from a mangrove habitat on Ambon Island, Indonesia. *Zootaxa* 4227(4): 573-582.

Silva, C. F., Seixas, V. C., Barroso, R., Di Domenico, M., Amaral, A. C. Z. & Paiva, P. C. 2017. Demystifying the *Capitella capitata* complex (Annelida, Capitellidae) diversity by morphological and molecular data along the Brazilian coast. *PLoS ONE* 12(5): e0177760.

Silva, C. F., Shimabukuro, M., Alfaro-Lucas, J. M., Fujiwara, Y., Sumida, P. Y. G. & Amaral, A. C. Z. 2016. A new *Capitella* polychaete worm (Annelida: Capitellidae) living inside whale bones in the abyssal South Atlantic. *Deep-Sea Research I* 108: 23-31.

Warren, L. M. 1976. A Population Study of the Polychaete *Capitella capitata* at Plymouth. *Marine Biology* 38: 209-216.

Version History:

Version 1.0—Voucher sheet created (06JUN2024)

LOS ANGELES COUNTY
SANITATION DISTRICTS
Converting Waste Into Resources

SCAMIT Newsletter
Vol. 42 No. 3-4

Voucher Sheet

B. Haggin

August, 2024

Species: *Heteromastus* sp LA3 — Haggin, 2023 § — P-code—none

Synonyms: *Heteromastus filiformis* Cmplx — of authors SCB; in part — ITI-code—none

Heteromastus filiformis — of authors NEP; not (Claparède, 1864)

Heteromastus filiformis — of authors NEP; not Blake 2000

Family: Capitellidae
Order:
Infraclass: Scolecida
Subclass: Sedentaria
Class: Polychaeta
Phylum: Annelida

Diagnostic Characters:

1) Prostomium with eyespots absent **(images 1 & 3)**.
2) Thorax areolated, but not inflated thru chaetiger 4, chaetigers 5-11 smooth **(images 1 & 2)**.
3) Thorax with 11 chaetigers, 5 with capillary chaetae
4) Thoracic formula - $^{(5c+6h)}/_{(5c+6h)}$
5) Abdominal hooded hooks with 11-15 small teeth in 3 rows above the main fang
6) Branchiae present from middle abdominal segments as short, broadly-based, rounded lamellae
7) Pygidium unknown

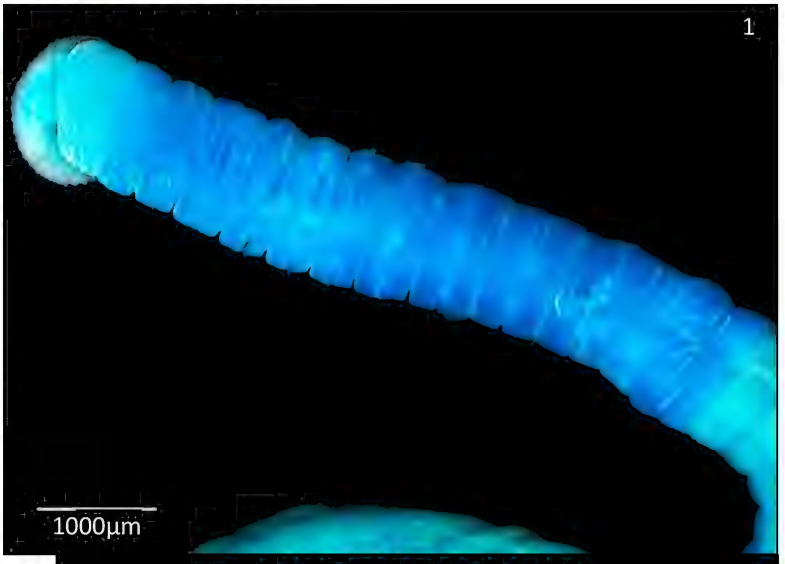
Pigmentation/MGS:

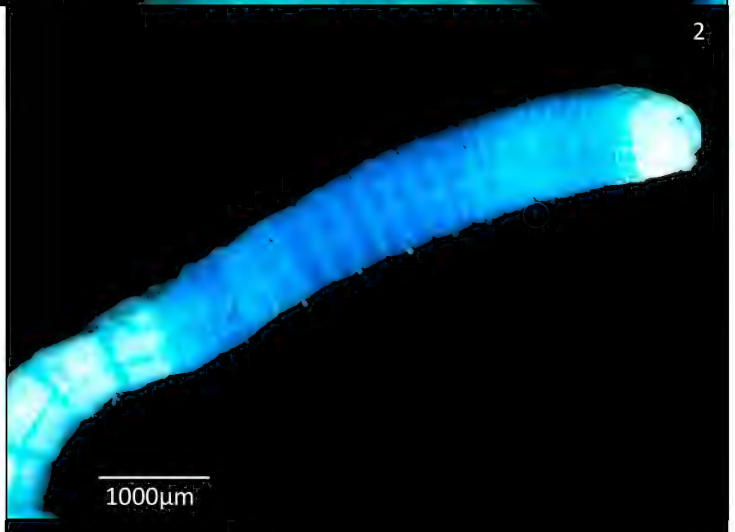
1) Prostomium and peristomium unstained or retaining light stain **(images 1-3)**.
2) Thoracic stain darkest on chaetigers 6-11, most intense on chaetigers 7-9, with a lighter band on the anterior of chaetiger 11 **(images 2 & 4)**.
3) Abdomen with inter-segmental banding **(image 4)**.
4) Ventral stripes in the abdomen described by Blake (2000) for NEP material was not observed **(image 5)**.

Material Examined:

LACSD stations: 0793-0A (305 m—33.81830N, 118.45420W—14JUL93) - 1 individual **(images 1, 3 & 4)**; 0196 -7A (315 m—33.69770N, 118.35320W—23JAN96) - 1 individual **(images 2 & 5)**

All photos by B. Haggin

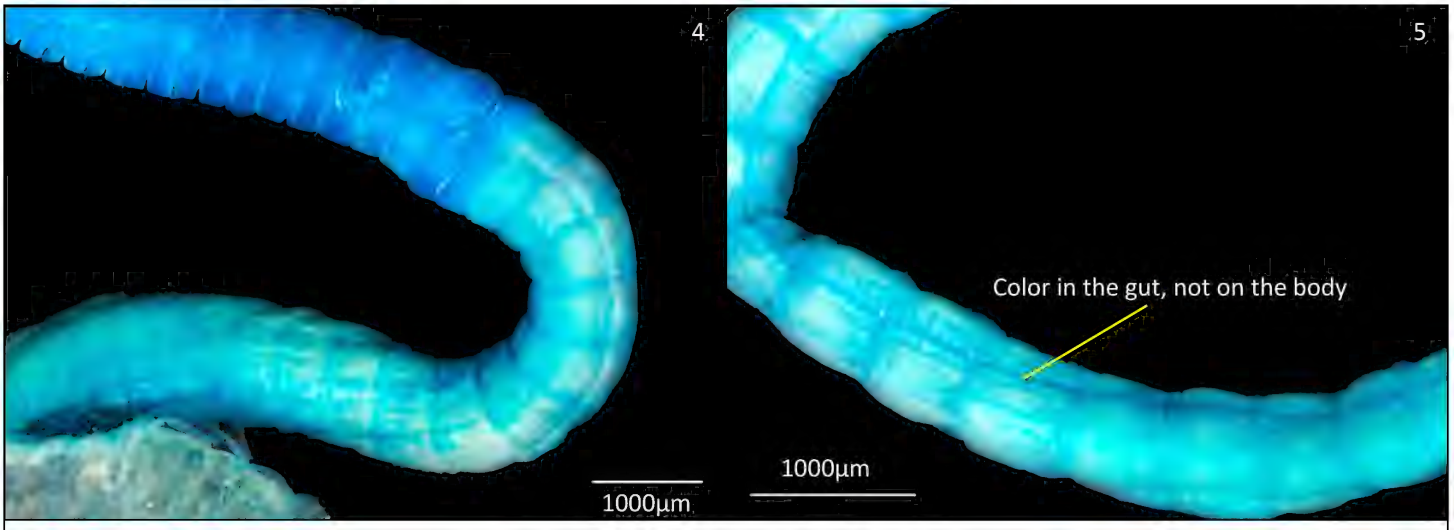




Heteromastus sp LA3

Haggin, 2023 §

Voucher Sheet
B. Haggin
August, 2024



Similar Species:

Heteromastus filiformis Claparède, 1864 (*sensu* Hutchings & Rainer, 1982)—*Heteromastus filiformis* as re-described by Hutchings & Rainer (1982) has short, broad-based, rounded branchiae beginning around the 90th abdominal chaetiger. The MGS pattern for *H. filiformis* was not described by Hutchings and Rainer. The branchiae of *H.* sp LA3 are also short, rounded lamellae but begin more anteriorly.

NEP *Heteromastus filiformis* Claparède, 1864 (*sensu* Blake, 2000)—The MGS pattern of NEP *Heteromastus filiformis* as described by Blake (2000) is similar to *H.* sp LA3 in having a solidly staining thorax but differs from *H.* sp LA3 in having a band of speckles on the posterior of half of the abdominal segments and in having a pair of stripes mid-ventrally. *Heteromastus* sp LA3 lacks the mid-ventral stripes described by Blake and has a solid posterior stain band. The branchiae of NEP *H. filiformis* (sensu Blake, 2000) begin around the 80th abdominal chaetiger while the branchiae of H. sp LA3 begin more anteriorly.

Korean *Heteromastus filiformis* Claparède, 1864 (*sensu* Choi & Yoon, 2016)—The MGS pattern of Korean *Heteromastus filiformis* as described by Choi & Yoon (2016) differs from *H.* sp LA3 in having a lightly staining thorax with slight banding on chaetigers 1 and 3-11, and a pair of mid-ventral stripes on the abdomen. *Heteromastus* sp LA3 has a solidly staining thorax, most intense on chaetigers 7-9, and lacks the mid-ventral stripes in the abdomen. The branchiae of Korean *H. filiformis* (*sensu* Choi & Yoon, 2016) begin around the 20th abdominal chaetiger, similar to *H.* sp LA3.

Heteromastus filobranchus Berkeley & Berkeley, 1932—*Heteromastus filobranchus* differs from *H.* sp LA3 in having up to 16 palmately arranged filiform branchiae per bundle from chaetiger 30-50 rather than short, rounded lamellae. The anterior abdomen of *H. filobranchus* sometimes retains a mid-dorsal stripe not seen in *Heteromastus* sp LA3.

Heteromastus sp LH1 Harris, 20XX §—*Heteromastus* sp LH1 differs from *H.* sp LA3 in having up to 8 palmately arranged filiform branchiae per bundle from chaetiger 55-100 rather than short, rounded lamellae. The abdomen of *H.* sp LH1 retains a dark dorsal stain on each segment, forming a continuous stripe down the body.

Heteromastus sp LA3

Haggin, 2023 §

Voucher Sheet
B. Haggin
August, 2024

Discussion:

Heteromastus filiformis (Claparéde, 1864) was originally described from Port-Vendres, France and was re-described by Hutchings & Rainer (1982) but from a locality in Egypt, 1,664 miles from the type locality. Morphological and staining differences reported from Korean material (Choi & Yoon, 2016) show that this is indeed a species complex and acknowledged that the NEP *Heteromastus filiformis* reported by Blake (2000) are likely a different species. Based on this, local specimens of *H. filiformis* matching the stain pattern described in this voucher sheet should use the new provisional name *Heteromastus* sp LA3 Haggin, 2023 §. Variations in the abdominal stain pattern from what was described by Blake (2000) suggests that there may be an additional provisional species regionally that may have been previously reported as *Heteromastus filiformis*.

A review of additional *Heteromastus filiformis* Cmplx from LACSD has yielded two more provisional species based on the stain pattern. One individual has the stain pattern as described by Blake (2000) for NEP *Heteromastus filiformis*, with midventral stripes in the abdomen. A second individual has an unstained anterior thorax and an intense stain in the posterior thorax, a stain pattern unique for NEP *Heteromastus filiformis* Cmplx. Voucher sheets for these individuals will follow at a later time.

Habitat:

Heteromastus sp LA3 is currently only known from the Palos Verdes Peninsula from a depth of 305-315m and occurs in silty sediments. This range will likely expand across southern California as local reviews of *Heteromastus filiformis* occur.

References:

Berkeley, E. & Berkeley, C. 1932. Some Capitellidae (Polychaeta) from the northeast Pacific with a description of a new genus. *Proceedings of the Zoological Society of London* 102(3): 669-675.

Blake, J. A. 2000. Family Capitellidae Grube, 1862. pages 47-96. IN: Blake, J. A., Hilbig, B. & Valentich-Scott, P. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 7 - The Annelida Part 4 - Polychaeta: Flabelligeridae to Sternaspidae*. Santa Barbara Museum of Natural History.

Choi, H. K. & Yoon, S. M. 2016. First record of *Heteromastus filiformis* (Polychaeta: Capitellidae) from Korean waters, with a taxonomic note on the genus. *Journal of Species Research* 5(3): 264-271.

Claparède, É. 1870. Les Annélides Chétopodes du Golfe de Naples. Supplément. *Mémoires de la Société de physique et d'histoire naturelle de Genève* 20(2): 365-542.

Hutchings, P. A. & Rainer, S. 1982. Designation of a neotype of *Capitella filiformis* Claparède, 1964, type species of the genus *Heteromastus* (Polychaeta: Capitellidae). *Records of the Australian Museum* 34(4): 373-380.

Other Literature Consulted:

Fauchald, K. 1977. The polychaete worms, definitions and keys to the orders, families and genera. *Natural History Museum of Los Angeles County: Los Angeles, CA (USA), Science Series* 28: 1-188.

Hartman, O. 1969. *Atlas of the sedentariate polychaetous annelids from California*. 1-812. Allan Hancock Foundation, University of Southern California. Los Angeles.

Jeong, M-K., Soh, H. Y. & Suh, H-L. 2019. Three new species of *Heteromastus* (Annelida, Capitellidae) from Korean waters, with genetic evidence based on two gene markers. *Zookeys* 869: 1-18.

Other Literature Consulted cont.:

Magalhães, W. F. & Blake, J. A. 2020. 7.6.4 Capitellidae Grube, 1862. pp. 349–403, *In*: Purschke, G., Böggemann, M. & Westheide, W. (Eds.), *Handbook of Zoology. Annelida*, 2 (Pleistoannelida, Sedentaria II), pp. 1–465.

Version History:

Version 1.0—Voucher sheet created (19AUG2024)

LOS ANGELES COUNTY
SANITATION DISTRICTS
Converting Waste Into Resources

SCAMIT Newsletter
Vol. 42 No. 3-4

Voucher Sheet

B. Haggin
June, 2024

Species: *Notomastus* sp LA3 Haggin, 2023 §
P-code—P336
Synonyms:
ITI-code—none

Family: Capitellidae
Order:
Infraclass: Scolecida
Subclass: Sedentaria
Class: Polychaeta
Phylum: Annelida

Diagnostic Characters:

1) Prostomium with palpode present, minute; eyespots not observed.
2) Thorax smooth, not noticeably inflated anteriorly.
3) 1st chaetiger complete.
4) Thoracic formula $^{(11c)}/_{(11c)}$
5) Abdomen with branchiae present, palmate, notopodial in nature.
6) Abdomen pinches laterally near branchial insertion, giving the appearance of a dorsal ridge in posterior abdomen.
7) Lateral organs and nephridial pores not observed.
8) Anal cirri not observed and pygidial detail unknown due to caudal regeneration.

Pigmentation/MGS:

1) Thorax stains uniformly.
2) Abdomen with dorso-lateral stain, becoming more dorsal only from branchial insertion, stain concentrates along dorsal ridge in posterior abdomen.
3) Branchiae unstained, giving the appearance of two unstained spots dorsally on posterior abdominal segments
4) Abdomen is unstained ventrally.

Material Examined:

LACM-AHF Poly# 12392 (DISCO ID: 17991) (320m—33.825°N 118.444°W—29AUG19) - 1 individual (incomplete fragment)

LACM-AHF Poly# 12394 (DISCO ID: 17993) (320m—33.825°N 118.444°W—29AUG19) - 1 individual (in 3 pieces, complete with caudal regen)

All photos by B. Haggin

Notomastus sp LA3

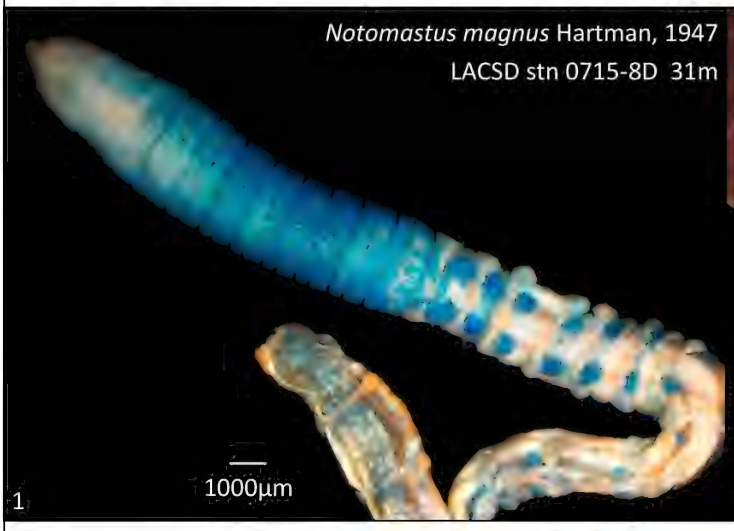
Haggin, 2023 §

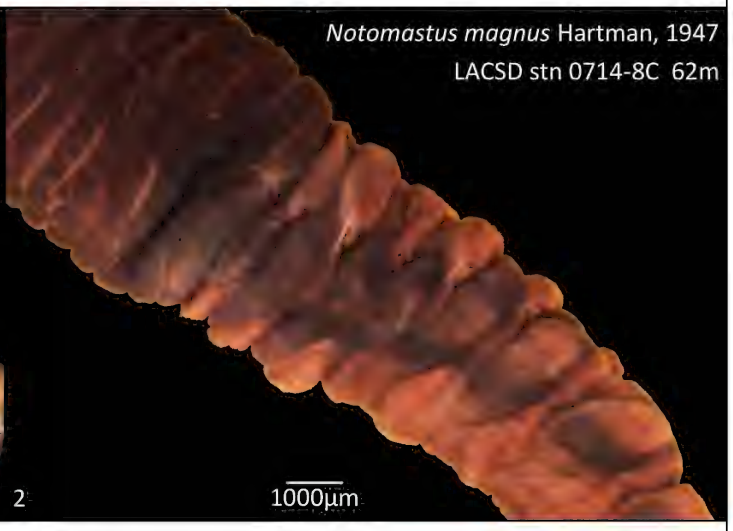
Voucher Sheet
B. Haggin
June, 2024

Similar Species:

Notomastus sp LA3 is most similar to other local *Notomastus spp.* with a biramous first chaetiger, *Notomastus magnus* Hartman,1947; *Notomastus* sp E Harris, 2021 §; *Notomastus* sp LA4 Haggin, 2023 §; *Notomastus* sp LA5 Haggin, 2023 §; *Notomastus* sp SD2 Rowe, 1999 §; and *Notomastus* sp SD3 Rowe, 2004 §. Differences between the species are detailed below.

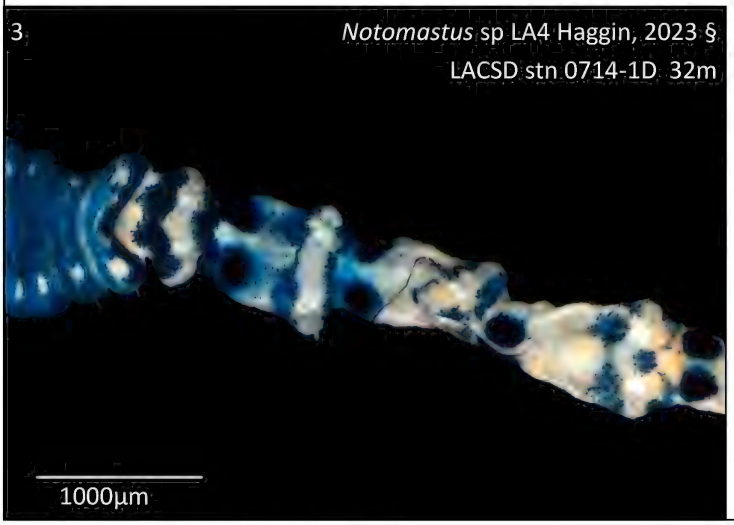
Notomastus magnus Hartman, 1947—*Notomastus magnus* is a large, robust species that is similar to N. sp LA3 in lacking eyes and having palmate branchiae. *Notomastus magnus* differs in having an aerolated, rather than smooth thorax, branchiae from anterior rather than median-posterior abdominal chaetigers and has 2 staining morphologies in the abdominal chaetigers depending on its reproductive status. The first is a large, broad dorsal patch **(image 1)**. The second is a set of paired dorsal spots **(image 2)**. *Notomastus* sp LA3 differs from *N. magnus* by having a stain pattern with a dorsal band and unstained branchiae, giving the inverse stain pattern as a reproductive *N. magnus*.





Notomastus sp E Harris, 2021 §—*Notomastus* sp E differs from *Notomastus* sp LA3 in having eyes, simple rather than palmate branchiae, and in the stain pattern. *Notomastus* sp E has an intense staining band on chaetiger 6 while the rest of the animal retains a uniform stain without any distinctive patterns in the abdominal region.

Notomastus sp LA4 Haggin, 2023 §—*Notomastus* sp LA4 differs from *N.* sp LA3 in having an aerolated rather than a smooth thorax, having eyes, having simple rather than palmate branchiae, and in the stain pattern. *Notomastus* sp LA4 has a pair of staining bands and, when reproductive, a pair of dorsal stain spots **(image 3)**. *Notomastus* sp LA3 has a dorso-lateral abdominal stain and an unstained ventrum. The branchiae do not stain leaving a pair of unstained spots in the abdomen.

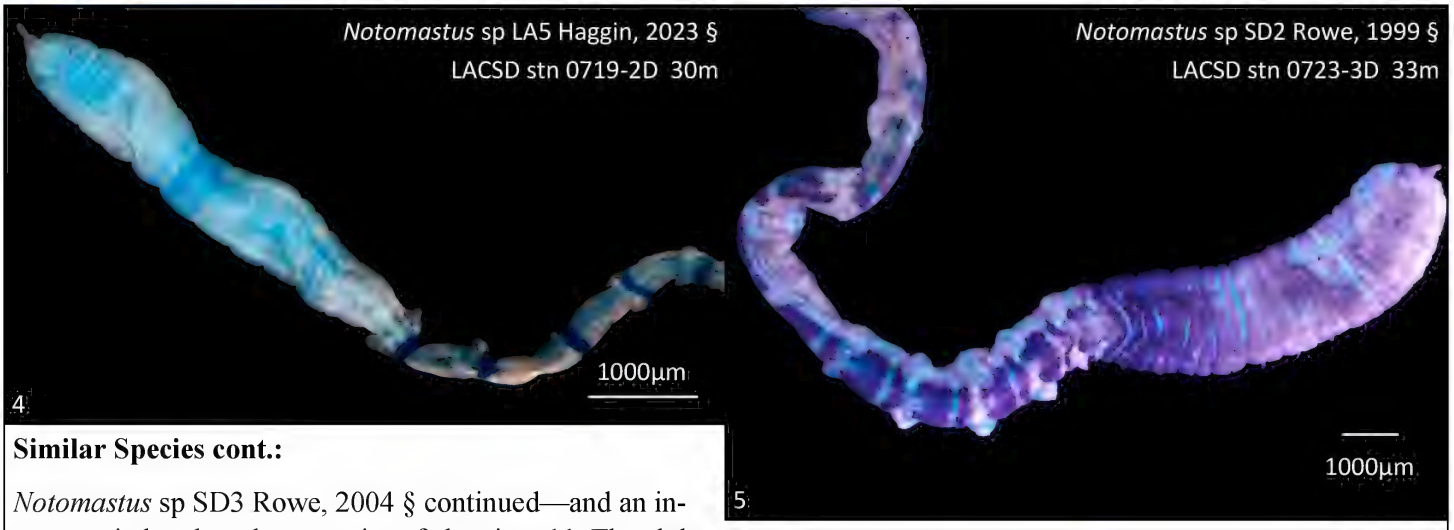


Notomastus sp SD3 Rowe, 2004 §—*Notomastus* sp SD3 differs from *N.* sp LA3 in the posterior thoracic and abdominal stain pattern. The thorax of *Notomastus* sp SD3 has a dark stain band on the anterior of chaetiger 10, an unstained posterior chaetiger 10 and anterior chaetiger 11

Notomastus sp LA3

Haggin, 2023 §

Voucher Sheet
B. Haggin
June, 2024



Similar Species cont.:

Notomastus sp SD3 Rowe, 2004 § continued—and an intense stain band on the posterior of chaetiger 11. The abdomen has a post-chaetal mid-dorsal stain dot and a "U" shaped stain patch that opens anteriorly, giving the appearance of a smiling cyclops. *Notomastus* sp LA3 has a dorso-lateral abdominal stain and an unstained ventrum. The branchiae do not stain leaving a pair of unstained spots in the abdomen.

Notomastus sp LA5 Haggin, 2023 §—*Notomastus* sp LA5 differs from *N.* sp LA3 in having an areolated rather than a smooth thorax, having simple rather than palmate branchiae and in the abdominal stain pattern. *Notomastus* sp LA5 has a single staining band in the abdomen **(image 4)**. *Notomastus* sp LA3 has a dorso-lateral abdominal stain and an unstained ventrum. The branchiae do not stain leaving a pair of unstained spots in the abdomen.

Notomastus sp SD2 Rowe, 1999 §—*Notomastus* sp SD2 is similar to *N.* sp LA3 in lacking eyes but differs in the abdominal stain pattern. *Notomastus* sp SD2 has a broad pre-chaetal dorsal stain patch that appears as a "U" shape that opens to the posterior **(image 5)**. *Notomastus* sp LA3 has a dorso-lateral abdominal stain and an unstained ventrum. The branchiae do not stain leaving a pair of unstained spots in the abdomen.

Discussion:

The lack of eyes and palmate branchiae make *Notomastus* sp LA3 most likely to have been mis-identified as *Notomastus magnus* prior to using methyl green staining patterns. *Notomastus magnus* was originally described from the intertidal of Tomales Bay and now has a depth range of up to 900m (Blake 2000) and has been reported south to the tip of Baja California and back north into the Gulf of California (García-Garza *et al.* 2019). Hartman (1960) tentatively referred a species from the East Cortes Basin (1415-1979m) (Hartman & Barnard 1958) to *Notomastus magnus* even though it was only known from intertidal and shallow depths. Reports such as these suggest that *Notomastus magnus* may be a local species complex and a review of older records using MGS, especially records from deeper depths, may be needed to resolve this issue.

Habitat:

Notomastus sp LA3 is known only from 2 individuals. It was found in the Redondo Canyon of Santa Monica Bay at a depth of 320m in muddy substrate.

Notomastus sp LA3

Haggin, 2023 §

Voucher Sheet
B. Haggin
June, 2024

References:

Blake, J. A. 2000. Family Capitellidae Grube, 1862. pages 47-96. IN: Blake, J. A., Hilbig, B. & Valentich-Scott, P. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 7 - The Annelida Part 4 - Polychaeta: Flabelligeridae to Sternaspidae*. Santa Barbara Museum of Natural History.

García-Garza, M. E., de León-González, J. A. & Tovar-Hernández, M. A. 2019. Catalogue of *Notomastus* M. Sars, 1851 (Annelida, Capitellidae) and the description of a new species from the Gulf of California. *Zootaxa* 4577 (2): 249-273.

Harris, L. H. 2021. *Notomastus* sp E Harris 2021 § & comparisons to NEP *N. latericeus* & NEP *N. lineatus*, *N. magnus* & *Scyphoproctus oc*ulatus. *SCAMIT Handout*.

Hartman, O. 1947. Polychaetous Annelids. Part VII. Capitellidae. *Allan Hancock Pacific Expeditions* 10(4): 391-481.

Hartman, O. 1960. Systematic account of some marine invertebrate animals from the deep basins off southern California. *Allan Hancock Pacific Expeditions* 22(2): 69-216.

Hartman, O. & Barnard, J. L. 1958. The Benthic Fauna of the Deep Basins off Southern California. *Allan Hancock Pacific Expeditions* 22(1): 1-67.

Other Literature Consulted:

Ewing, R. M. 1982. A partial revision of the genus *Notomastus* (Polychaeta: Capitellidae) with a description of a new species from the Gulf of Mexico. *Proceedings of the Biological Society of Washington* 95(2): 232-237.

Ewing, R. M. 1984. Family Capitellidae Grube, 1862. Chapter 14. IN: Uebelacker, J. M. & Johnson, P. G. *Taxonomic Guide to the Polychaetes of the Northern Gulf of Mexico. Volume II*. Minerals Management Service, Metairie, Louisiana.

Fauchald, K. 1977. The polychaete worms, definitions and keys to the orders, families and genera. *Natural History Museum of Los Angeles County: Los Angeles, CA (USA), Science Series* 28: 1-188.

Garciá-Garza, M. E. & de León-González, J. A. 2015. The genus *Notomastus* (Polychaeta: Capitellidae) in the Gulf of California, Mexico, with the description of three new species. *Proceedings of the Biological Society of Washington* 128(2): 176-189.

Hartman, O. 1969. *Atlas of the sedentariate polychaetous annelids from California*. 1-812. Allan Hancock Foundation, University of Southern California. Los Angeles.

Jeong, M-K., Soh, H. Y., Wi, J. H. & Suh, H-L. 2018. A new *Notomastus* (Annelida, Capitellidae) species from Korean waters, with genetic comparison based on three gene markers. *ZooKeys* 754: 141-155.

Magalhães, W. F. & Blake, J. A. 2020. 7.6.4 Capitellidae Grube, 1862. pp. 349–403, *In*: Purschke, G., Böggemann, M. & Westheide, W. (Eds.), *Handbook of Zoology. Annelida*, 2 (Pleistoannelida, Sedentaria II), pp. 1–465.

Version History:

Version 1.0—Voucher sheet created (18JUN2024)

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

SCAMIT Newsletter
Vol. 42 No. 3-4

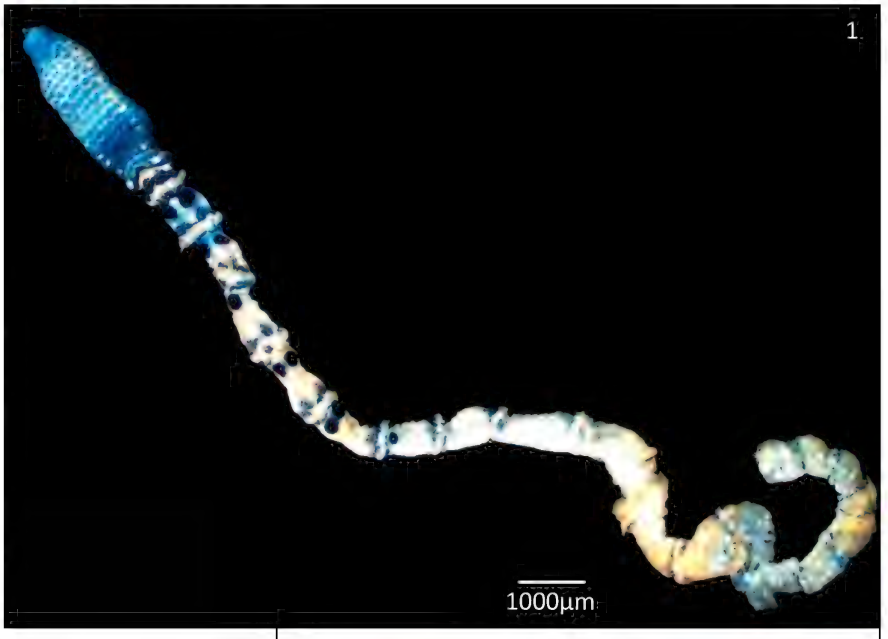
Voucher Sheet

B. Haggin
June, 2024

Species: *Notomastus* sp LA4 Haggin, 2023 § P-code—P336

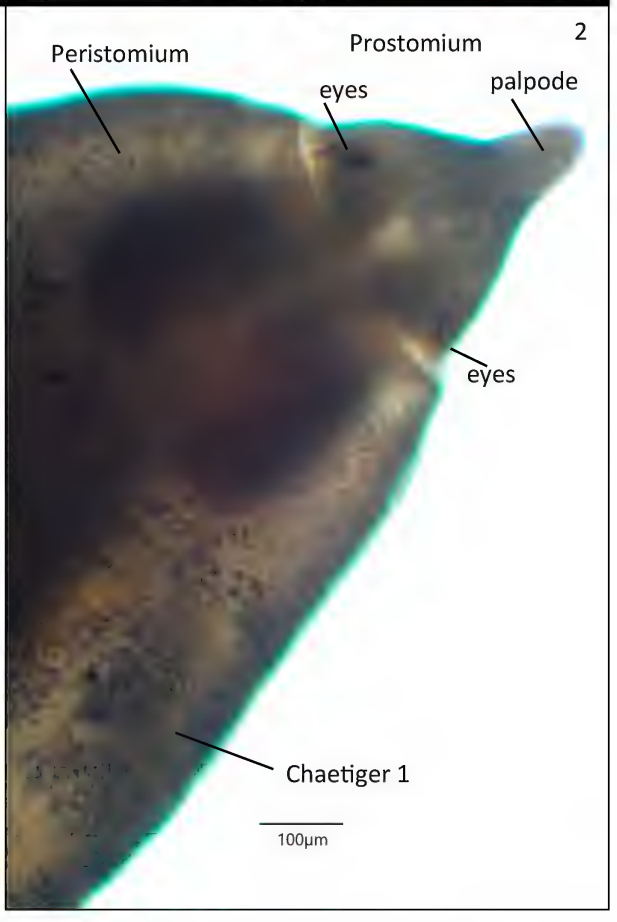
Synonyms: *Notomastus latericeus* of authors SCB; not M. Sars, 1851 ITI-code—none

Family: Capitellidae
Order:
Infraclass: Scolecida
Subclass: Sedentaria
Class: Polychaeta
Phylum: Annelida



Diagnostic Characters:

1) Prostomium small, conical; palpode present; eyes present as dorsolateral ocular patches, sometimes obscured by peristomium **(images 1—5)**.
2) Chaetigers 1-5 areolated, inflated; chaetiger 6 & 7 less areolated, less inflated; chaetigers 8-11 smooth **(images 3 & 4)**.
3) First chaetiger complete, thorax with capillary chaetae only **(images 4 & 5)**.
4) Thoracic Formula - $^{(11c)}/_{(11c)}$
5) Abdominal hooded hooks with 1-2 rows of small teeth surmounting main fang (difficult to discern even @ 1000X) **(images 6 & 7)**.
6) Branchiae present in abdomen, rudimentary, as small dorsolateral swellings of notopodia and large triangular extensions of neuropodia **(images 8 & 9)**.
7) Lateral organs present from chaetiger 1, between noto– and neuropodia, present throughout thorax **(image 3)**.
8) Pygidium unknown.
9) Eggs visible thru body wall of abdomen in reproductive individuals **(image 10)**.



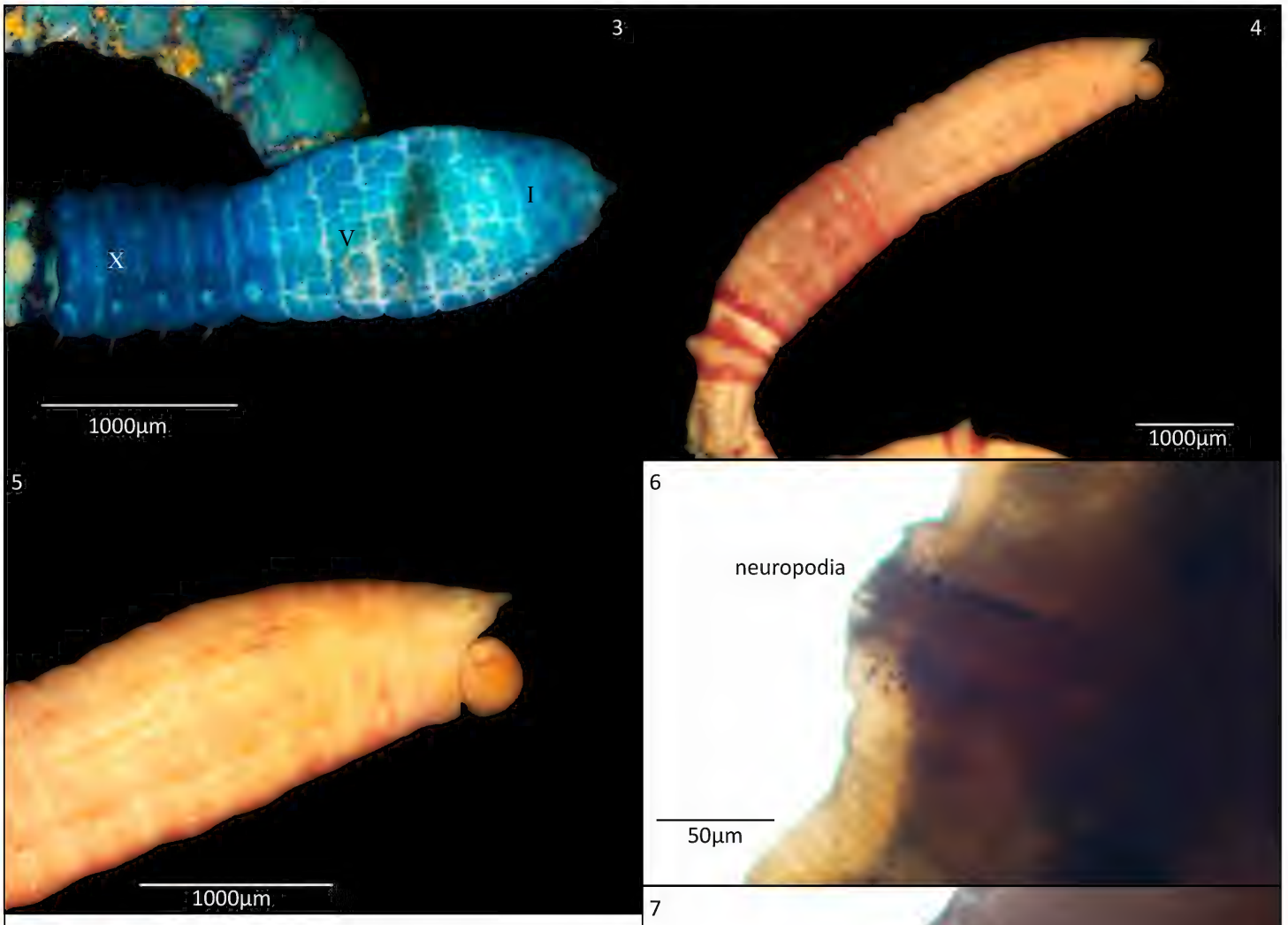
Pigmentation/MGS:

1) Palpode unstained.
2) Prostomium staining lightly; peristomium stains lightly anteriorly, darker posteriorly **(images 1 & 3)**.
3) Chaetigers 1-7 staining moderaterly **(images 1, 3 & 4)**.
4) Chaetigers 8-11 staining intensely **(images 1, 3 & 4)**.
5) Abdomen with pre- & post-chaetal stain bands, most intense dorsally **(images 1, 8, 9, 11, 12 & 13)**.
6) Genital pores stain as paired dorsal spots in anterior abdomen **(image 11)** (may be absent in juveniles or non-reproductive individuals) **(image 13)**.

Notomastus sp LA4

Haggin, 2023 §

Voucher Sheet
B. Haggin
June, 2024



Material Examined:

LACSD stations: 0714-1D (32 m—33.76512N, 118.43526W—08JUL14) - 1 individual **(images 1, 10, 11)**; 0716-1D (31 m—33.76494N, 118.43569W—12JUL16) - 1 individual; 0722-1D (31m—33.76506N, 118.43539W—12JUL22) - 1 individual **(images 3 & 13)**; 0723-1D (30m—33.76529N, 118.43506W—10JUL23) - 6 individuals **(images 2, 6 & 7)**

CLAEMD stations: A2 (15m—33.91862N, 118.44805W—07JUL20) - 1 individual **(images 4, 5, 8, 9 & 12)**

All photos by B. Haggin

Similar Species:

Notomastus sp LA4 is most similar to other local *Notomastus spp.* with a biramous first chaetiger, *Notomastus magnus* Hartman,1947; *Notomastus* sp E Harris, 2021 §; *Notomastus* sp LA3 Haggin, 2023 §; *Notomastus* sp LA5 Haggin, 2023 §; *Notomastus* sp SD2 Rowe, 1999 §; and *Notomastus* sp SD3 Rowe, 2004 §. Differences between the species are detailed below.

Notomastus sp LA4

Haggin, 2023 §

Voucher Sheet
B. Haggin
June, 2024

Similar Species cont.:

Notomastus magnus Hartman, 1947—*Notomastus magnus* is a large, robust species that lacks eyes and has retractile, palmate branchiae from anterior abdominal chaetigers. *N. magnus* has 2 staining morphologies in the abdominal chaetigers depending on its reproductive status. The first is a large, broad dorsal patch **(image 14)**. The second is a set of paired

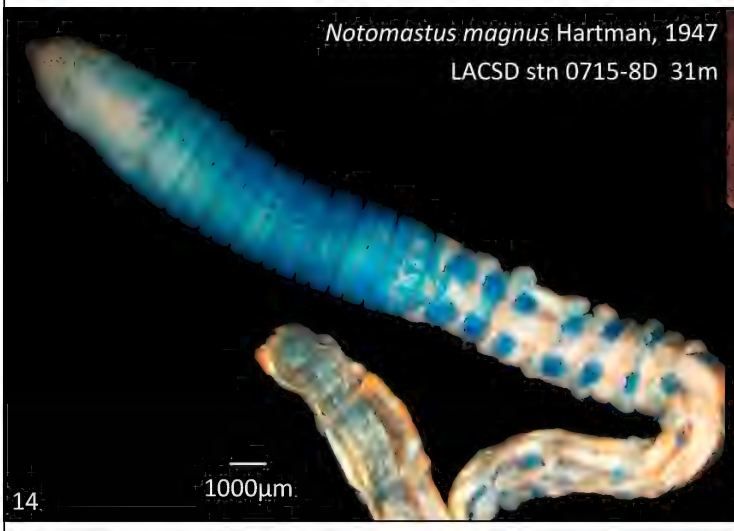
Notomastus sp LA4

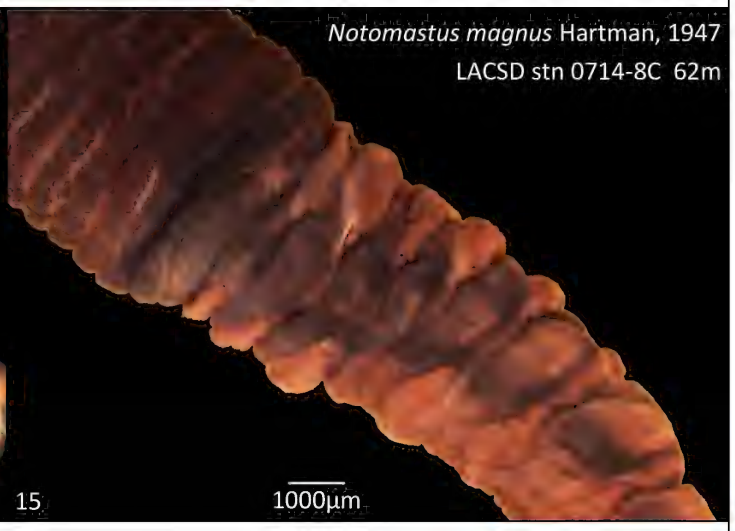
Haggin, 2023 §

Voucher Sheet
B. Haggin
June, 2024

Similar Species cont.:

Notomastus magnus continued— dorsal spots **(image 15)**. *Notomastus* sp LA4 differs from *N. magnus* by having eyes and having rudimentary branchiae as swellings of the noto– & neuropodial lobes. The stain pattern of *N.* sp LA4 also differs in having pre- & post-chaetal staining bands rather than a broad dorsal patch **(image 13)**. When reproductive, *N.* sp LA4 also has paired dorsal stain spots, but it retains the stain bands as well **(images 1 & 11)**.





Notomastus sp E Harris, 2021 §—*Notomastus* sp E is similar to *Notomastus* sp LA4 in also having eyes but differs in the stain pattern. *Notomastus* sp E has an intense staining band on chaetiger 6 while the rest of the animal retains a uniform stain without any distinctive patterns in the abdominal region.

Notomastus sp LA3 Haggin, 2023 §—*Notomastus* sp LA3 differs from *N.* sp LA4 in having a smooth rather than an areolated thorax, lacking eyes, having palmate rather than simple branchiae, and in the stain pattern. *Notomastus* sp LA3 has a dorso-lateral abdominal stain and an unstained ventrum. The branchiae do not stain leaving a pair of unstained spots in the abdomen. *Notomastus* sp LA4 has a pair of staining bands and, when reproductive, a pair of dorsal stain spots.

Notomastus sp LA5 Haggin, 2023 §—*Notomastus* sp LA5 differs from *N.* sp LA4 in lacking, rather than having eyes and in the abdominal stain pattern. *Notomastus* sp LA5 has a single post-chaetal stain band **(image 16)** rather than both pre– and post-chaetal staining bands and lacks the paired dorsal stain spots found in reproductive *Notomastus* sp LA4 **(images 11 & 13)**.

Notomastus sp SD3 Rowe, 2004 §—*Notomastus* sp SD3 differs from *N.* sp LA4 in the posterior thoracic and abdominal stain pattern. The thorax of *Notomastus* sp SD3 has a dark stain band on the anterior of chaetiger 10, an unstained posterior chaetiger 10 and anterior chaetiger 11 and an intense stain band on the posterior of chaetiger 11. The abdomen has a post-chaetal mid-dorsal stain dot and a "U" shaped stain patch that opens anteriorly, giving the appearance of a smiling cyclops. *Notomastus* sp LA4 has

Notomastus sp LA4

Haggin, 2023 §

Voucher Sheet
B. Haggin
June, 2024

Similar Species cont.:

Notomastus sp SD3 Rowe, 2004 § continued—a pre- and post-chaetal stain band and paired dorsal stain spots in reproductive individuals.

Notomastus sp SD2 Rowe, 1999 §—*Notomastus* sp SD2 differs from *N.* sp LA4 in lacking eyes and in the abdominal stain pattern. *Notomastus* sp SD2 has a broad prechaetal dorsal stain patch that appears as a "U" shape that opens to the posterior **(image 17)**. *Notomastus* sp LA4 has a pre– and post-chaetal stain band and paired dorsal stain spots in reproductive individuals.

Discussion:

Notomastus latericeus M. Sars, 1851 was originally described from either Cobscook Bay, New Brunswick, Canada (WoRMS) or the Norwegian Sea, Norway (García-Garza *et al*. 2019). The species has since gained a cosmopolitan distribution with a depth range of intertidal to 4360m. The most recent re-description was by Ewing (1984) but was based on material from the Gulf of Mexico and not from either of the potential type localities. Descriptions of the staining patterns were not given by Ewing (1984).

García-Garza *et al*. (2019) does not list any records of *Notomastus latericeus* from the Pacific Ocean, the closest being from Viet Nam. They do recognize that *N. latericeus* was considered a cosmopolitan species by multiple authors but that those records need to be confirmed. Green (2002) described the staining pattern of what she called *N.* near *latericeus* from the Andaman Sea and it is clearly different that what we have locally. She also recognized the reported variation in hooded hook dentition from different localities and suggested that *Notomastus latericeus* is a species complex.

Hernández-Alcántara & Solis-Weiss reported *Notomastus latericeus* from the Gulf of California in 1993, 1998, and 1999 but a re-examination of the material by García-Garza & de León-González (2011) found them to be *Notomastus magnus*. True *Notomastus latericeus* likely does not occur locally and the provisional species *Notomastus* sp LA4 Haggin, 2023 § should be used in its place.

Habitat:

Notomastus sp LA4 is known from the Santa Monica Bay and Palos Verdes at a depth of 15-32m. This range is likely to increase across southern California as local reviews of *Notomastus latericeus* occur.

References:

Blake, J. A. 2000. Family Capitellidae Grube, 1862. pages 47-96. IN: Blake, J. A., Hilbig, B. & Valentich-Scott, P. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 7 - The Annelida Part 4 - Polychaeta: Flabelligeridae to Sternaspidae*. Santa Barbara Museum of Natural History.

Notomastus sp LA4

Haggin, 2023 §

Voucher Sheet
B. Haggin
June, 2024

References cont.:

Ewing, R. M. 1984. Family Capitellidae Grube, 1862. Chapter 14. IN: Uebelacker, J. M. & Johnson, P. G. *Taxonomic Guide to the Polychaetes of the Northern Gulf of Mexico. Volume II*. Minerals Management Service, Metairie, Louisiana.

García-Garza, M. E. & de León-González, J. A. 2011. Review of Capitellidae (Annelida, Polychaeta) from the Eastern Tropical Pacific region, with notes on selected species. *ZooKeys* 151: 17-52.

García-Garza, M. E., de León-González, J. A. & Tovar-Hernández, M. A. 2019. Catalogue of *Notomastus* M. Sars, 1851 (Annelida, Capitellidae) and the description of a new species from the Gulf of California. *Zootaxa* 4577 (2): 249-273.

Green, K. D. 2002. Capitellidae (Polychaeta) from the Andaman Sea. *Phuket Marine Biological Center Special Publication* 24: 249-343.

Harris, L. H. 2021. *Notomastus* sp E Harris 2021 § & comparisons to NEP *N. latericeus* & NEP *N. lineatus*, *N. magnus* & *Scyphoproctus oc*ulatus. *SCAMIT Handout*.

Hartman, O. 1947. Polychaetous Annelids. Part VII. Capitellidae. *Allan Hancock Pacific Expeditions* 10(4): 391-481.

Rowe, R. 1995. *Notomastus latericeus* voucher sheet. *City of San Diego Voucher Sheet*.

Other Literature Consulted:

Ewing, R. M. 1982. A partial revision of the genus *Notomastus* (Polychaeta: Capitellidae) with a description of a new species from the Gulf of Mexico. *Proceedings of the Biological Society of Washington* 95(2): 232-237.

Fauchald, K. 1977. The polychaete worms, definitions and keys to the orders, families and genera. *Natural History Museum of Los Angeles County: Los Angeles, CA (USA), Science Series* 28: 1-188.

Garciá-Garza, M. E. & de León-González, J. A. 2015. The genus *Notomastus* (Polychaeta: Capitellidae) in the Gulf of California, Mexico, with the description of three new species. *Proceedings of the Biological Society of Washington* 128(2): 176-189.

Hartman, O. 1969. *Atlas of the sedentariate polychaetous annelids from California*. 1-812. Allan Hancock Foundation, University of Southern California. Los Angeles.

Jeong, M-K., Soh, H. Y., Wi, J. H. & Suh, H-L. 2018. A new *Notomastus* (Annelida, Capitellidae) species from Korean waters, with genetic comparison based on three gene markers. *ZooKeys* 754: 141-155.

Magalhães, W. F. & Blake, J. A. 2020. 7.6.4 Capitellidae Grube, 1862. pp. 349–403, *In*: Purschke, G., Böggemann, M. & Westheide, W. (Eds.), *Handbook of Zoology. Annelida*, 2 (Pleistoannelida, Sedentaria II), pp. 1–465.

Version History:

Version 1.0—Voucher sheet created (18JUN2024)

Version 1.1—Updated references (20JUN2024)

LOS ANGELES COUNTY
SANITATION DISTRICTS
Converting Waste Into Resources

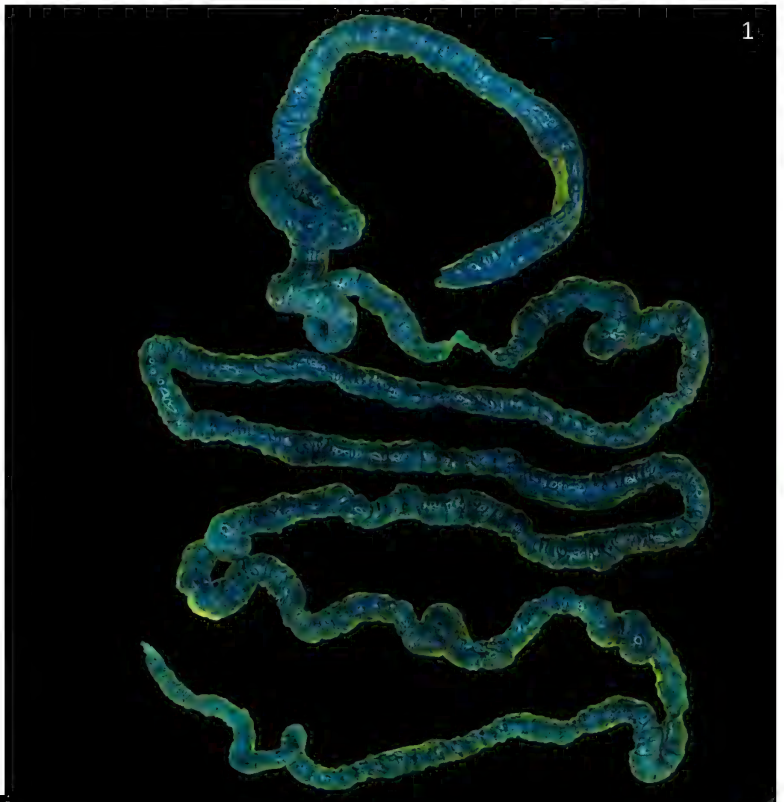
SCAMIT Newsletter
Vol. 42 No. 3-4

Voucher Sheet

B. Haggin
June, 2024

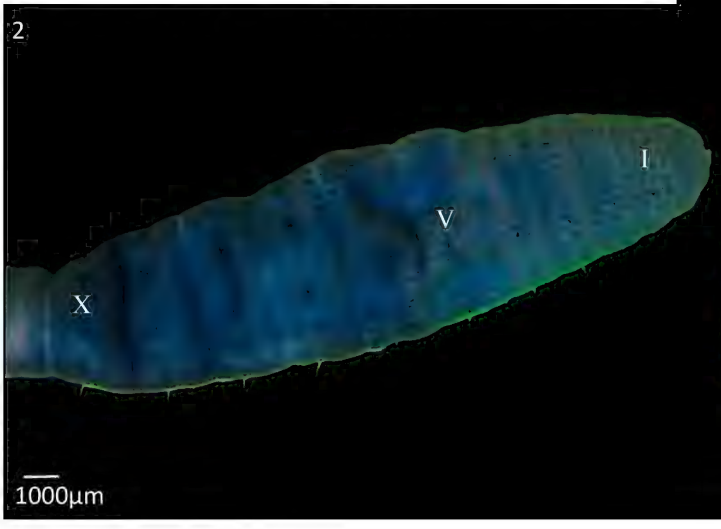
Species: *Notomastus* sp LA5 | Haggin, 2023 § | P-code—P336
Synonyms: *Notomastus lineatus* | of authors SCB; not Claparède, 1869 | ITI-code—none

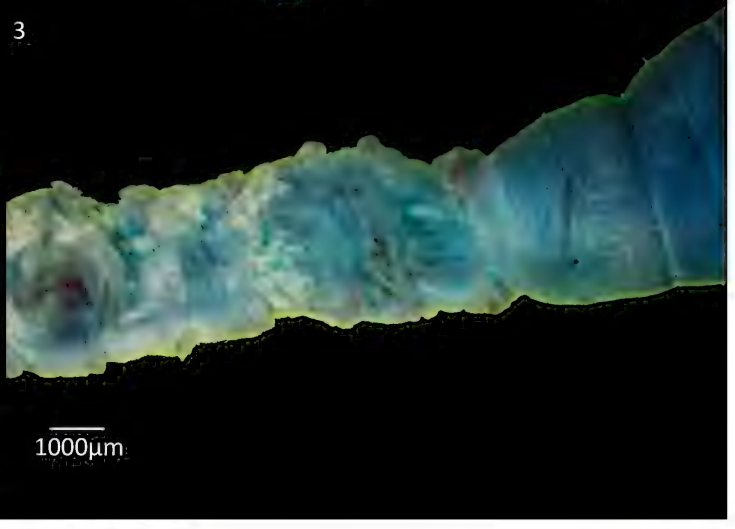
Family: Capitellidae
Order:
Infraclass: Scolecida
Subclass: Sedentaria
Class: Polychaeta
Phylum: Annelida



Diagnostic Characters:

1) Prostomium small, conical; palpode present; eyes absent **(images 1 & 2)**.
2) Thorax areolated thru chaetiger 8, then smoother **(images 2 & 3)**.
3) Chaetiger 1 complete, thorax with capillary chaetae only.
4) Thoracic formula - $^{11c}/_{11c}$
5) Branchiae present from anterior abdomen; simple lobes **(image 4)**.
6) Abdominal neuropodia with long tori, nearly touching at midline **(image 5)**.





7) Pygidium unknown.

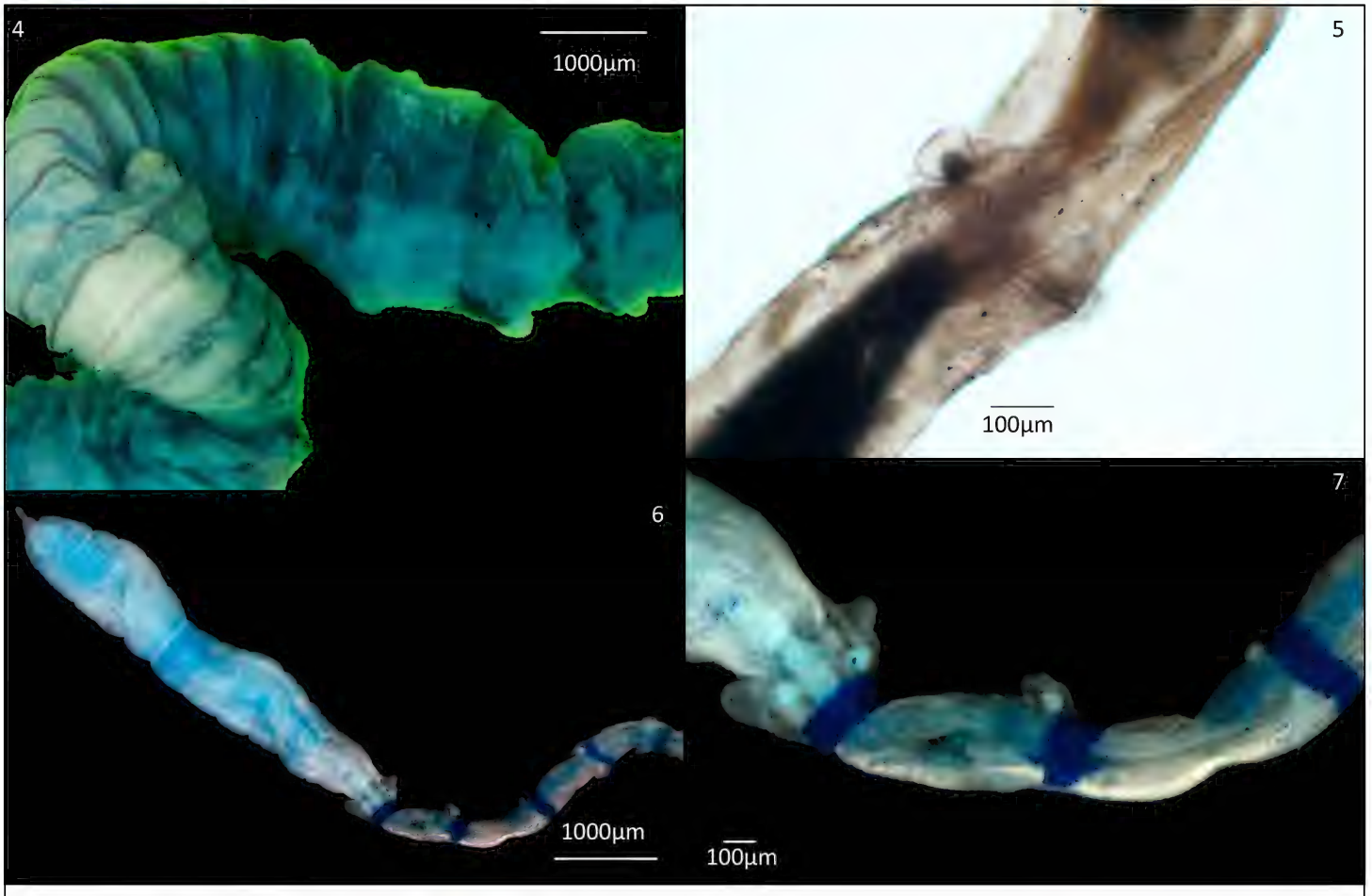
Pigmentation/MGS:

1) Palpode unstained **(image 6)**.
2) Prostomium & Peristomium staining lightly **(images 2 & 6)**.
3) Chaetigers 1-3 with moderate stain **(images 2 & 6)**.
4) Chaetigers 4-5 staining lightly **(images 2 & 6)**.
5) Chaetiger 6 staining darkly **(images 2 & 6)**.
6) Chaetigers 7-11 staining moderately, with a darker band on chaetiger 10 **(images 2 & 6)**.
7) Abdomen with stain band in segmental furrow only, without prechaetal band or paired dorsal stain spots **(image 7)**.

Notomastus sp LA5

Haggin, 2023 §

Voucher Sheet
B. Haggin
June, 2024



Material Examined:

LACSD stations: 0797-2D (31m—33.74113N, 118.42132W—09JUL97) - 1 individual (**images 1 - 4**); 0719-2D (30 m—33.74125N, 118.42121W—23JUL19) - 2 individuals **(images 5 - 7)**

All photos by B. Haggin

Similar Species:

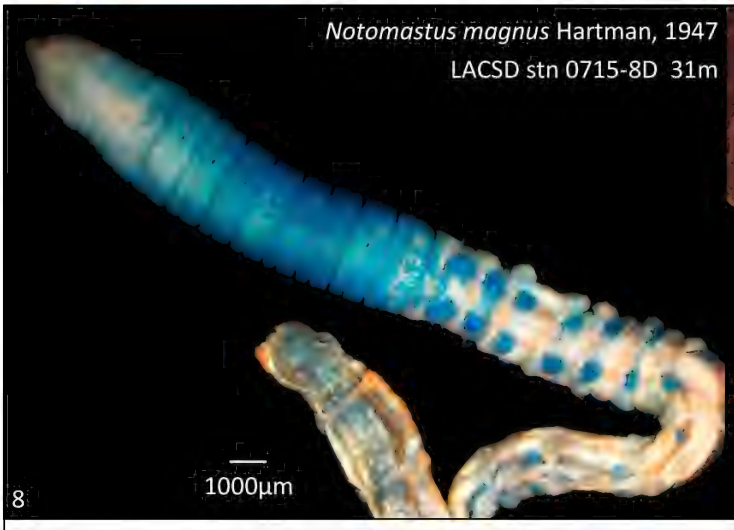
Notomastus sp LA4 is most similar to other local *Notomastus spp.* with a biramous first chaetiger, *Notomastus magnus* Hartman,1947; *Notomastus* sp E Harris, 2021 §; *Notomastus* sp LA3 Haggin, 2023 §; *Notomastus* sp LA4 Haggin, 2023 §; *Notomastus* sp SD2 Rowe, 1999 §; and *Notomastus* sp SD3 Rowe, 2004 §. Differences between the species are detailed below.

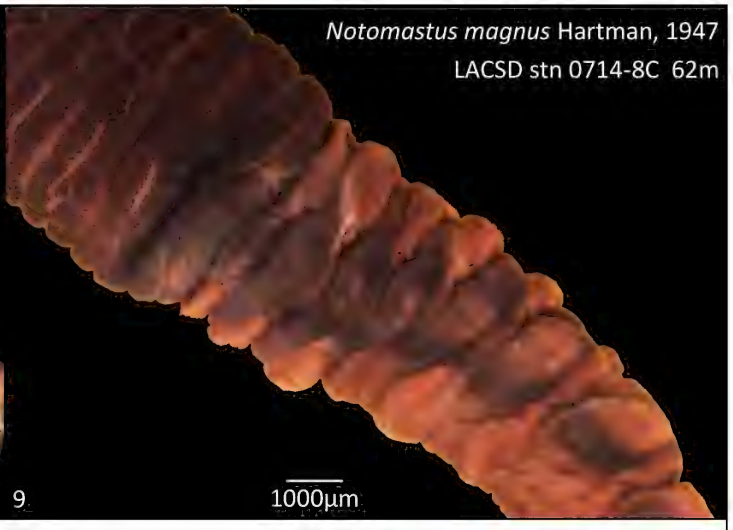
Notomastus sp E Harris, 2021 §—*Notomastus* sp E differs from *Notomastus* sp LA5 in having eyes and in the stain pattern. *Notomastus* sp E has an intense staining band on chaetiger 6 while the rest of the animal retains a uniform stain without any distinctive patterns in the abdominal region. *Notomastus* sp LA5 also has a darker staining band on chaetiger 6, but also has variable staining bands on the rest of the thorax and has a distinctive post-chaetal stain band in the abdominal region **(images 2, 6 & 7)**.

Notomastus sp LA5

Haggin, 2023 §

Voucher Sheet
B. Haggin
June, 2024



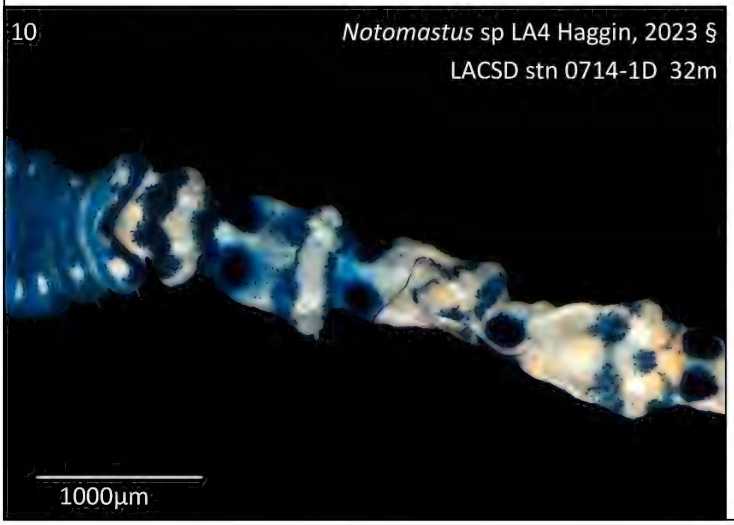


Similar Species cont.:

Notomastus magnus Hartman, 1947—*Notomastus magnus* is a large, robust species that lacks eyes and has retractile, palmate branchiae from anterior abdominal chaetigers. *N. magnus* has 2 staining morphologies in the abdominal chaetigers depending on its reproductive status. The first is a large, broad dorsal patch **(image 8)**. The second is a set of paired dorsal spots **(image 9)**. *Notomastus* sp LA5 also lacks eyes but differs from *N. magnus* by having branchiae as simple lobes. The stain pattern of *N.* sp LA5 also differs in having a single post-chaetal staining band rather than a broad dorsal patch **(images 6 & 7)**. *Notomastus* sp LA5 lacks paired dorsal stain spots, even when reproductive.

Notomastus sp LA3 Haggin, 2023 §—*Notomastus* sp LA3 differs from *N.* sp LA5 in having a smooth rather than an areolated thorax, having palmate rather than simple branchiae and in the abdominal stain pattern. *Notomastus* sp LA3 has a dorso-lateral abdominal stain and an unstained ventrum. The branchiae do not stain leaving a pair of unstained spots in the abdomen. *Notomastus* sp LA5 has a single staining band in the abdomen.

Notomastus sp LA4 Haggin, 2023 §—*Notomastus* sp LA4 differs from *N.* sp LA5 in having, rather than lacking eyes and in the abdominal stain pattern. *Notomastus* sp LA4 has a both pre– and post-chaetal staining bands **(image 10)** rather than only a post-chaetal stain band **(images 6 & 7)** and reproductive *N.* sp LA4 has paired dorsal stain spots **(image 10)** not found *Notomastus* sp LA5 regardless of reproductive state.



Notomastus sp SD3 Rowe, 2004 §—*Notomastus* sp SD3 differs from *N.* sp LA5 in the posterior thoracic and abdominal stain pattern. The thorax of *Notomastus* sp SD3 has a dark stain band on the anterior of chaetiger 10, an unstained posterior chaetiger 10 and anterior chaetiger 11 and an intense stain band on the posterior of chaetiger 11. The abdomen has a post-chaetal mid-dorsal stain dot and a "U" shaped stain patch that opens anteriorly, giving the appearance of a smiling cyclops. *Notomastus* sp LA5 lacks the non-staining band on chaetigers 10 and 11 and the abdominal stain has only post-chaetal stain band.

Notomastus sp LA5

Haggin, 2023 §

Voucher Sheet
B. Haggin
June, 2024

Similar Species cont.:

Notomastus sp SD2 Rowe, 1999 §—*Notomastus* sp SD2 is similar to *N.* sp LA5 in lacking eyes but differs in the abdominal stain pattern. *Notomastus* sp SD2 has a broad prechaetal dorsal stain patch that appears as a "U" shape that opens to the posterior **(image 11)**. *Notomastus* sp LA5 has a post-chaetal stain band in abdominal chaetigers.

Discussion:

Notomastus lineatus Claparéde, 1869 was originally described from the Gulf of Naples, Italy. It was subsequently reported from British Columbia, Canada by Berkeley & Berkeley (1932) and the from Newport Bay by Hartman (1947). *Notomastus lineatus* was redescribed by Ewing (1984) with material from the Gulf of Mexico but did not give a description of the methyl green stain pattern. García-Garza *et al.* (2019) mentions that this species is considered cosmopolitan but that the records need to be re-examined to confirm its wide distribution.

Green (2002) reported a species as *N.* near *lineatus* from the Andaman Sea and described its two staining variations. Both of these stain patterns are different than our local representative. She also commented on the variation in reported hooded hook dentition. These variations imply that *Notomastus lineatus* is a species complex. It currently has a reported cosmopolitan distribution and a depth range of subtidal to 298m.

García-Garza & de León-González (2011) re-examined material identified as *N. lineatus* by Bastida-Zavala in 1993 and found them to be *Dasybranchus parplatyceps* Kudenov, 1975. They also re-examined material from Hernández-Alcántara & Solís-Weiss in 1998 and found them to be a mix of *Notomastus magnus*; *N. polyodon* Gallardo, 1968; *N. cinctus* Fauchald, 1972; and *N. angelicae* Hernández-Alcántara & Solís-Weiss, 1998. True *Notomastus lineatus* is likely not found locally and the provisional species *Notomastus* sp LA5 Haggin, 2023 § should be used in its place.

Habitat:

Notomastus sp LA5 is known from Pt. Vicente, Palos Verdes at a depth of 30-31m. This range is likely to expand across southern California as local reviews of *Notomastus lineatus* occur.

References:

Berkeley, E. & Berkeley, C. 1932. Some Capitellidae (Polychaeta) from the northeast Pacific with a description of a new genus. *Proceedings of the Zoological Society of London* 102(3): 669-675.

Blake, J. A. 2000. Family Capitellidae Grube, 1862. pages 47-96. IN: Blake, J. A., Hilbig, B. & Valentich-Scott, P. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 7 - The Annelida Part 4 - Polychaeta: Flabelligeridae to Sternaspidae*. Santa Barbara Museum of Natural History.

Claparède, É. 1870. Les Annélides Chétopodes du Golfe de Naples. Supplément. *Mémoires de la Société de physique et d'histoire naturelle de Genève* 20(2): 365-542.

Notomastus sp LA5

Haggin, 2023 §

Voucher Sheet
B. Haggin
June, 2024

References cont.:

Ewing, R. M. 1984. Family Capitellidae Grube, 1862. Chapter 14. IN: Uebelacker, J. M. & Johnson, P. G. *Taxonomic Guide to the Polychaetes of the Northern Gulf of Mexico. Volume II*. Minerals Management Service, Metairie, Louisiana.

García-Garza, M. E. & de León-González, J. A. 2011. Review of Capitellidae (Annelida, Polychaeta) from the Eastern Tropical Pacific region, with notes on selected species. *ZooKeys* 151: 17-52.

García-Garza, M. E., de León-González, J. A. & Tovar-Hernández, M. A. 2019. Catalogue of *Notomastus* M. Sars, 1851 (Annelida, Capitellidae) and the description of a new species from the Gulf of California. *Zootaxa* 4577 (2): 249-273.

Green, K. D. 2002. Capitellidae (Polychaeta) from the Andaman Sea. *Phuket Marine Biological Center Special Publication* 24: 249-343.

Harris, L. H. 2021. *Notomastus* sp E Harris 2021 § & comparisons to NEP *N. latericeus* & NEP *N. lineatus*, *N. magnus* & *Scyphoproctus oc*ulatus. *SCAMIT Handout*.

Hartman, O. 1947. Polychaetous Annelids. Part VII. Capitellidae. *Allan Hancock Pacific Expeditions* 10(4): 391-481.

Pasko, D. 1994. *Notomastus lineatus* voucher sheet. *SCAMIT Handout*.

Other Literature Consulted:

Ewing, R. M. 1982. A partial revision of the genus *Notomastus* (Polychaeta: Capitellidae) with a description of a new species from the Gulf of Mexico. *Proceedings of the Biological Society of Washington* 95(2): 232-237.

Fauchald, K. 1977. The polychaete worms, definitions and keys to the orders, families and genera. *Natural History Museum of Los Angeles County: Los Angeles, CA (USA), Science Series* 28: 1-188.

Garciá-Garza, M. E. & de León-González, J. A. 2015. The genus *Notomastus* (Polychaeta: Capitellidae) in the Gulf of California, Mexico, with the description of three new species. *Proceedings of the Biological Society of Washington* 128(2): 176-189.

Hartman, O. 1969. *Atlas of the sedentariate polychaetous annelids from California*. 1-812. Allan Hancock Foundation, University of Southern California. Los Angeles.

Jeong, M-K., Soh, H. Y., Wi, J. H. & Suh, H-L. 2018. A new *Notomastus* (Annelida, Capitellidae) species from Korean waters, with genetic comparison based on three gene markers. *ZooKeys* 754: 141-155.

Magalhães, W. F. & Blake, J. A. 2020. 7.6.4 Capitellidae Grube, 1862. pp. 349–403, *In*: Purschke, G., Böggemann, M. & Westheide, W. (Eds.), *Handbook of Zoology. Annelida*, 2 (Pleistoannelida, Sedentaria II), pp. 1–465.

Version History:

Version 1.0—Voucher sheet created (18JUN2024)

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

SCAMIT ARTHROPOD MEETING – 16 OCTOBER 2023

(Minutes by D. Pasko)

Meeting location: LACSD

Brent opened the meeting and deftly stalled as Dean fumbled around for a version of his key to the family of amphipods – intended to be a focus of the meeting – but which had not been loaded to the meeting's Google Drive. After some embarrassing moments, Dean was able to start discussing arthropods.

The point of this meeting was to coordinate Bight'23 arthropod identifications as much as possible, with respect to data recording, identification resources, the introduction of a suite of SCB specific keys that Dean has been working to finalize. The meeting went forward somewhat clumsily as Dean struggled to synchronize his jumpy mouse with the computer screen being shared with the audience.

Dean initially pointed people to the existing tools in the SCAMIT website, specifically the various reviews that Don Cadien has posted to the site. Though buried in the toolbox hierarchy Don has posted reviews of cumaceans by family, tanaids, in addition to the gammarid amphipods organized by superfamily as listed in SCAMIT Ed 13. Unfortunately, that organization changed drastically with Edition 14.

Most significantly, Dean had updated his key to the family of amphipods reported by SCAMIT, which broadens John Chapman's 2007 key from Light's Manual and incorporates information and keys from Don Cadien's compilation of Northeastern Pacific (NEP) amphipod reviews mentioned above. In concert with this effort, he has been updating other amphipod family keys, specifically those that typically generate identification issues (e.g., Photidae, Ischyroceridae, Aoridae, Phoxocephalidae, etc.). [Host's note: several small errors have been discovered in the posted keys. These will be corrected and reposted soon.)

Dean then gave a brief overview of the family key, dated 29 September 2023, encouraging users to do two things: (1) take note of and read the referenced Endnotes, several of which include valuable information on limits to the identification of a particular taxon or other restrictions; and (2) send him questions about, or comments on, the key.

This effort was followed by a few examples of his family keys. In particular, he pointed to updates to oft perplexing photids and aorids. Dean had recently updated his *Photis* key, which is now incorporated into the Key to the SCB Photidae, as well as his *Aoroides* table, now included in the Key to the SCB Aoridae. The latter benefited from an effort by Don Cadien to reduce the reliance on color, the mandibular palp, and cusps on the teeth of the maxilliped inner plate, which are so heavily relied upon by Dean's table. The new key seems to work well.

There was some discussion of *Photis* characteristics used in the key as well as other useful characters not included in the key (e.g., setation of antennae and gnathopods, eye shape and size, etc.). For example, when faced with a large number of specimens containing multiple species, one can key in on a specific adult character (e.g., antennal length, antennal setation, pigment, epimeron 3 shape) and track that character to smaller and smaller specimens allowing for the identify many juvenile or immature specimens with confidence. Work one's way down from the larger adult specimens to smaller and smaller ones is a technique that can hopefully reduce the frequency of "*Photis* sp" records. Don agreed and commented that *Photis* have a plethora of characters that can be used to distinguish one species from another, especially within the limits of a sample.

We discussed the three size groupings of *Photis* (large, medium and small) that Don has also observed. Dean has presented this information previously (e.g., SCAMIT NL, Vol 35 No 6). Size is very important in distinguishing *P. californica* and *P. brevipes*, the later maturing at ~2.5mm larger than *P. californica*. For example, the two species are distinguished by the presence of a dactylar tooth in the male gnathopod 2 dactyl in *P. brevipes*; absent in *P. californica.* The dactylar tooth begins forming in juvenile male *P. brevipes* at about 3.5mm specimen. The dactylar tooth is absent

in male *P. californica*. So, even though adult *P. brevipes* reach 8+mm, even juvenile specimens can be distinguished from *P. californica* in the same sample by the presence of the swelling dactyl in 4mm specimens.

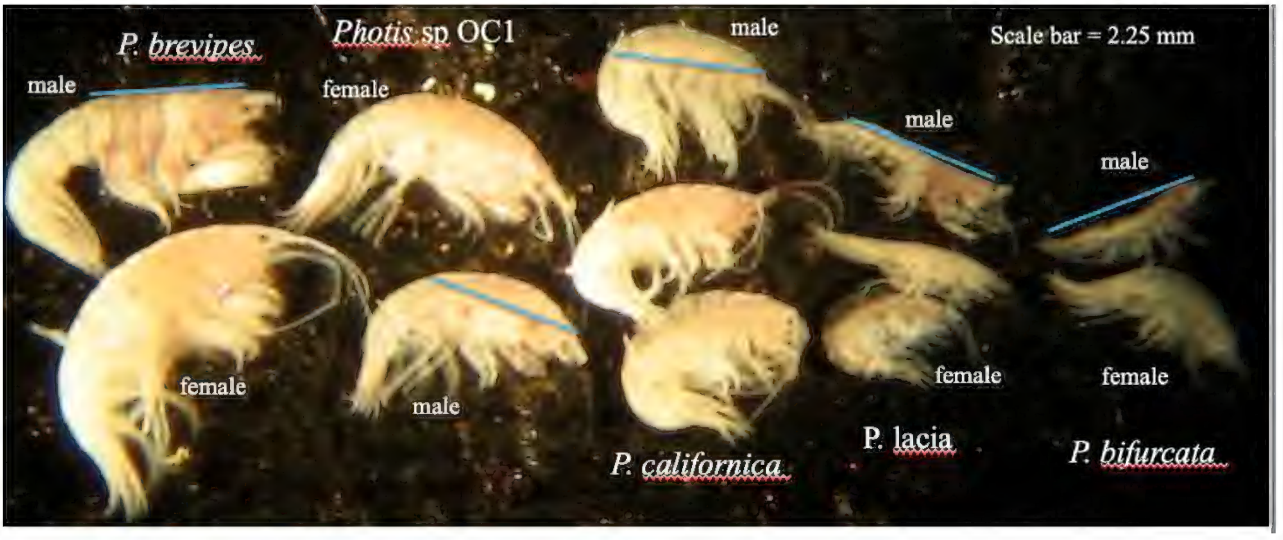


Table of reported sizes for *Photis* spp

Species	Male	Female
P. bifurcate	to 4.0 mm (Holotype 2.75 mm+)	to 3.5 mm
P. brevipes	to 8.0 mm+	to 6.0 mm
P. californica	4.5 mm+	
P. chiconola	Holotype 5.0 mm+	to 4.5 mm+
P. conchicola	to 5.5 mm	to 3.2 mm+
P. lacia	to 3.0 mm	to 3.3 mm
P. lineramanus	3.4 mm	
P. macinerneyi	to 4.3 mm	to 4.0 mm
P. macrotica	to 3.3 mm*	
P. parvidons	to 5.0 mm	to 6.0 mm
P. viuda	Holotype 5.0 mm+	
Photis sp A	<3.0 mm	2.8 mm
Photis sp B	2.5 mm	2.5 mm
Photis sp C	3.0 mm	3.5 mm
Photis sp E		3.25 mm
Photis sp OC1		4.0 mm
	*Size range from Conlan 1983	+Barnard 1962

The updated key to the Aoridae was also reviewed and discussed since it introduces some additional characters less reliant on mouthpart characteristics. In particular, the key relies on characters of the uropod 1 peduncle and setation of gnathopods 1 and 2 that can be quite reliable.

To avoid the boredom of going through key after key, Dean presented a list of the keys that will be added to the SCAMIT Webpage. These included keys cover the Amphilochidae, Aoridae, Bateidae, Caprellidae, Dexaminidae/Atylidae, Dulichiidae, Liljeborgidae, Lysianassoidea, Pardaliscidae,

Photidae, Phoxocephalidae, Podoceridae, Pontogenidaes, Synopiidae, and Uniciolidae. He also encouraged arthropod taxonomists to utilize Don's Northeastern Pacific (NEP) arthropod reviews for tanaid, cumacea, and amphipods (organized by Superfamily). If you haven't delved into them, these reviews are brimming with useful information including lists of species reported from the NEP, discussions of identification resources, keys generated by Don, generic diagnoses, detailed commentary of species with perplexing histories, and relevant taxonomic literature available at the time.

Don reminded everyone to take advantage of the recently published review to the SCB isopods by members Tim Stebbins and Regina Wetzer, and pointed to the endnotes which include a lot of valuable commentary to accompany the keys bringing light to potential problem areas of the keys and confusing taxa.

Dean closed with a discussion of the updated Phoxocephalidae key which he also populated with endnotes. Some time was spent discussing one footnote dealing with *Rhepoxynius lucubrans* and *R. menziesi*. He mentioned his review of type material of *R. lucubrans* at the Natural History Museum of Los Angeles County and found that the specimen did not have "lateral armaments" on urosomite 1 as discussed in Barnard and Barnard 1982 (page 20). Referencing personal experience with shallow water samples and *Rhepoxynius* with very short epistome that are consistently missing the "lateral armaments," Dean believes that the discussion included in Barnard and Barnard 1982 may have to be switched with respect to the presence/absence of ventro-lateral setae (or spines) on urosomite 1. The male type specimen (listed as a female) did not have "lateral armaments" on urosomite 1 while the other characters (e.g., the broader rostrum and much smaller epistomal cusp) did agree with Barnard and Barnard's discussion. Dean closed with a reminder to take note of endnotes to keys added by authors because they usually have them there for a reason.

Dean also noted that he's working on a revised key to the tanaids that merges Don's key to the NEP tanaids (Cadien 2014) with the Dojiri and Sieg key in the MMS Atlas (Dojiri and Sieg 1997) to accommodate all the SCAMIT recognized taxa in one key. While the key isn't quite ready for distribution, it is close. Interested parties can contact Dean individually for draft versions.

We then moved on to the discussion of ostracods. Don noted that a fair number of new ostracod voucher sheets have been deposited to the Toolbox, many of which had been started by Lisa Haney. These include mostly members of the *Philomedes* group: *Philomedes dentatus* Poulsen 1962, *Philomedes* sp A SCAMIT 1988 §, *Philomedes* sp LA1 Haney 2004 §, *Philomedes* sp SD1 Pasko 2014 §. Dean has also been working on a Key to the SCB ostracods, which has been a work in progress for a while. Andy brought up the idea of adding some sort of alert to material newly deposited to the SCAMIT toolbox. Brent noted that there is a "Latest Website Updates" in the upper right corner of the SCAMIT website to point people to new changes to the website and toolbox.

Dean took this moment to remind everyone about the issues encountered in Bight'18 regarding countable vs. non-countable- podocopid ostracod specimens. Countable specimens – those alive at the time of collection – should be distinguished from non-countable specimens – those specimens that were dead at the time of collection. The former typically have a clear, glistening carapace, with tissue present, eggs with developing embryos, etc., while the latter often have a dull, opaque carapace, exoskeleton of limbs present with little muscle or other tissue and are often filled with debris. Dean shared a slide showing these character differences, something he has shared previously via email to the SCAMIT listserver.

After a brief break, Mary gave her presentation on SCB brachyuran crabs. Mary provided some wonderful slides accompanied by very interesting discussions that cannot be replicated here. [The reader is encouraged to watch and listen to the presentation, starting at about the 1 hr, 4 min. mark in the recording and continuing for just over 30 minutes, through 1 hr 38 min.] She referenced her 2012 monograph (Wicksten 2012) as one of the most recently published comprehensive key to the

group along with Doug Jensen's guide to the Pacific coast decapods (Jensen 2014), noting that both were difficult to obtain because of their limited distribution. She also recommended the new Light's Manual (Kuris et al. 2007), despite issues with the included illustrations and bias towards central California.

Using *Micropanope latimanus* Stimpson 1871 as an example, Mary discussed the Xanthoid crabs (formally Xanthiidae) and the difficulty of identification, in part due to the difficulty in the original descriptions, type specimen lost to the fire in Chicago, history of confusing synonymies, some with vague original location designations (e.g., from "San Diego" or "Los Angeles area"). She currently considers *M. latimanus* to be a synonym of *Lophopanopeus frontalis* (Rathbun 1893). Many former xanthoid crabs are now listed under Panopeidae. She referenced Menzies (1948) as a good resource for many members of the group.

Macroregonia macrochira Sakai 1978 is a deepwater majoid crab that may be present in Southern California but Mary has not seen it yet. However, *Eurypanopeus hyperconvexus* Garth 1969 ***is*** present in Southern California, and was the last true crab to be described from Southern California. The identification can be made by the downward angle of the chelae fixed finger, the prominently pointed lateral carapace teeth, and long thin dactyls of the walking legs.

Parapinnixa affinis Holmes 1900, is common to bays and lives in terebellid tubes. It can be identified by the large first walking legs and broad, elongate carapace. It is currently on the IUCN endangered species list. It is likely listed in shallow waters, less than 3m, but Brent commented that he has seen something similar in his shelf-depth samples heavy with terebellids.

Mary then went on to discuss several subtidal crabs: *Deilocerus planus*, *Erileptus spinosus*, and *Pugettia venetiae*. *D. planus,* now in the family Cyclodipiidae, has modified hind limbs to carry things on top of the carapace. Don commented that this taxon is common around the coastal generating intakes, around the gravely substrates. *E. spinosus* is a tiny spider crab with fairly long eyestalks, and very long legs, similar to podochelids. It lives in similar habitat to *Deilocerus*, deep, shelly, gravely areas. *P. venetiae* was discussed next; it is sporadically reported from 18-120m. It does not have the hooked carapace setae typical of other spider crabs. *Chorilia*, a larger species, is also found in similar habitat and the two may be related.

Mary then explained ways to differentiate the very similar *Pugettia dalli* and *P. venetiae*, both of which are pictured in Garth (1958). *Pugettia dalli* has a pear-shaped carapace, long rostral forks, while the rostral spines of *P. venetiae* are more convergent and short, and the carapace more rounded. *Chorilia* spp look very similar to *P. venetiae* and may represent two species of *Chorilia,* although that hasn't been resolved. She discussed three papers reviewing this issue: Garth (1958) who noted the similarities between the two genera, Hultgren and Stochowitz (2008) who separated the two into different families, and Hendrickx (2015) who reviewed *Chorilia turgida* off the coast of Mexico.

She then went on to species that are now residents of southern California, starting with the now ubiquitous *Carcinius minus*, the introduced green crab. Another is the white-fingered mud crab, *Rhithropanopeus harrisii*, found in Oakland, but included in some sporadic reports from southern California, one from San Diego Bay sent to Mary by Dean. In Texas, it has been found in estuaries and inland lakes.

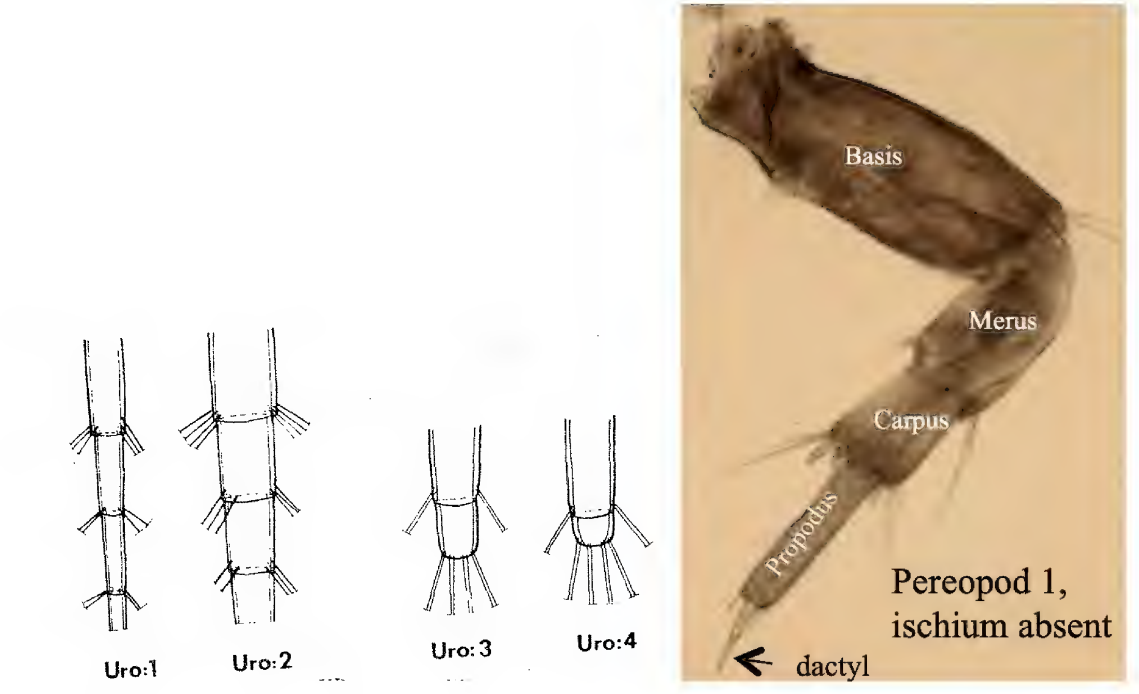
Mary then discussed some other less common species, including *Stenoryhnus debilis*, the arrow crab; the swimming crabs *Callinectes arcuatus*, *C. bellicosus*, *C sapidus*; *Gonopanope areolata*, recently found in Santa Monica and San Diego by Dean Pasko who sent the specimens to her for confirmation; and *Telmessus cheiragonus* found in Monterey Bay, but there are no intertidal records.

Mary then offered her services to look at any crabs. She has lots of upper division and graduate students who need projects and is happy to put them to work. After which some lively banter

ensued between Mary and the present members regarding methods of crab identification, and various species of crabs and whether their reported occurrences in southern California are real or dubious.

A discussion of podocopid copepods somehow led to Don's discussion of parasitic and commensal copepods. Prior to the screening of wash water for field sampling, we used to get a large number of calinoid copepods in our samples. While those numbers have gone down, Don recommended we make the effort to look for the commensal and parasitic copepods found among worms, clams, and decapods. Brent mentioned that, among the worms, many of these copepods are found in the back half of the worm tubes, so if you're only exposing the head end of a worm you may be missing "the opportunity" to find these copepods. Don encouraged folks to look for them among benthic and commensal copepods in their Bight samples.

Dean shared one more file, a revised key to the Tanaididae modified from Cadien (2014) dealing with *Sinelobus*, *Anatanais*, and *Zeuxo*. One character that has generated confusion is the first couplet of the Tanaid keys dealing with the length of the uropodal segments used to separate *Synaptotanis* from other tanaids. Dean explained his point of view using Figure 1 from Sieg and Winn (1981) as a reference point. His interpretation of the key is that *Synaptotanais* has each article of the uropod twice (or more) as long as broad (see Uro:1) relative to other taxa in which one or more distal uropodal articles (see Uro:2) will be significantly shorter than 2 times the width (≤1.5). He also discussed the absence of an ischium on pereopod 1 in Tanaidae, a sometimes difficult-to-observe character used to separate Tanaidae from other families of tanaids.



From Sieg & Winn (1981), Figure 1: Uropods and antenna 1 of different members of Tanaidae. **Uro:1** = uropod long and slender, articles more than twice as long as broad; **Uro:2** = uropod short, articles twice as long as broad; **Uro:3** = uropod with terminal article normal; Uro:4 = uropod with terminal article greatly reduced; Pereopod 1 of *Zeuxo normani* (Tanidae), photo by D. Pasko.

Finally, before breaking for lunch and the review of specimens, Dean lead a discussion of data reporting consistency for Bight'23. He cautioned everyone to take note of the significant changes in orthography of SCAMIT species and record and report their taxa according to SCAMIT. We also reviewed the usage of the Exclude code, as well as how to deal with epibionts (e.g., barnacles on

mollusk shells). We noted that there is likely a fair degree of inconsistency among laboratories relative to the counting of epibionts, and that the Bight Benthic Manual suggested excluding them from infaunal counts. Greg noted that epibionts are often dropped during the Regional Synoptic Data Review process because of this inconsistency. In the end, everyone acknowledged that inconsistency between laboratories would likely continue, unfortunately.

Don then asked all attendees to consider adopting the usage of subgenera when recording Cumacea, specifically *Leucon* spp. Subgenera are useful in distinguishing species of *Leucon* and can be very helpful for classifying the many provisional species that exist in SCAMIT. Dean then reminded everyone about Don's reviews of the 2006 NEP Cumacea, posted to the SCAMIT Toolbox. These reviews include keys that are very useful because they include a number of provisional species and can help provide information and characters to enlighten one to other potential taxa that he/she may not have otherwise considered.

The meeting then adjourned for lunch followed by a review of specimens. In addition to a few *Aoroides* spp for which we don't have records, the following City of San Diego Bight'23 specimens were reviewed and confirmed: *Pseudotaniais californiensis*, B23-12315, 524m; *Microjassa* sp, B23-12315, 524m; *Eurocope californiensis*, B'23 12319, 848m; *Belonectes* sp A, B'23 12319, 848m. The specimen of *Microjassa* was unusual in that coxa 1 was smaller than coxa 2, and uropod 3 had five large denticles on the outer ramus, which seemed quite unusual at the time. [In hindsight, however, this specimen may quite possibly represent *Ischyrocerus anguipes* Krøyer 1838, which has been reported as deep as 326m. Another quite distinctive *Ischyrocerus*, *I. malacus* JL Barnard 1964, was described from 1593m.]

Barnard, J.L. 1962. Benthic Marine Amphipoda of Southern California: 1. Families Aoridae, Photidae, Ischyroceridae, Corophiidae, Podoceridae. Pacific Naturalist 3, no. 1:3-72.

Barnard, J. L. and C. M. Barnard 1982a. The genus Rhepoxynius (Crustacea: Amphipoda: Phoxocephalidae) in American Seas, Smithsonian Contributions to Zoology, 357:iii + 1-149

Cadien D.B. 2014. Review of Order Tanaidacea in the Northeast Pacific – (between the equator and the Arctic Circle, and from intertidal to the abyss). dbcadien - LACSD (22Sept14)

Chapman, J.W. (2007). Amphipoda. *In:* The Light and Smith Manual: Intertidal Invertebrates from Central California to Oregon. Ed J.T. Carlton. 4th Edition. Pp. 545–618.

Conlan, Kathleen E. 1983. The amphipod superfamily Corophioidea in the northeastern

Pacific region. 3. Family Isaeidae: systematics and distributional ecology.National Museums of Canada Publications in Natural Sciences, no. 4: 1-75.

Dojiri, M. and J. Sieg (1997). The Tanaidacea. Santa Barbara, California, U.S.A., Santa Barbara Museum of Natural History.

Garth. J.S. (1958) Brachyura of the Pacific coast of America. Oxyrhyncha. Allan Hancock Pacific Expeditions, 21, 1–499.

Hendrickx, M.E. 2015. Further records of Chorilia turgida (Decapoda: Brachyura: Majoidea: Epialtidae) from the Pacific coast of Mexico. Revista Mexicana de Biodiversidad 86(2) 535–537

Hultgren, K. & Stachowitz, J. (2008) Molecular phylogeny of the brachyuran crab superfamily Majoidea indicates close congruence with trees based on larval morphology. Molecular Phylogenetics and Evolution, 48, 986-996.

Jensen, G.C. 2014. Crabs and Shrimps of the Pacific Coast: A guide to shallow-water decapods from southeastern Alaska to the Mexican Border. MolaMarine. 240pp

Kuris, A.M, Sadeghian, P.S., Carlton, J.T., Campos, E. (2007). Decapoda. *In:* The Light and Smith Manual: Intertidal Invertebrates from Central California to Oregon. Ed J.T. Carlton. 4th Edition. Pp. 632–656.

Menzies, R. J. 1948. A revision of the brachyuran genus Lophopanopeus. Allan Hancock Foundation Occasional Papers 4:1-45, Plates 1-6.

Sieg, J. and R. N. Winn (1981). "The Tanaidae (Crustacea: Tanaidacea) of California, with a key to the world genera." Proceedings of the Biological Society of Washington 94(2): 315-343

Stebbins TD, Wetzer R (2023) Review and guide to the isopods (Crustacea, Isopoda) of littoral and sublittoral marine habitats in the Southern California Bight. ZooKeys 1162: 1–167. https://doi.org/10.3897/zookeys.1162.100390

Wicksten, M.K. (2012) Decapod Crustacea of the Californian and Oregonian Zoogeographic Provinces. Zootaxa 3371: 1–307. www.mapress.com/zootaxa.

Arthropod Personals -Seeking companion?
Part 3 – "The shrimp that mistook its parasite for a hat'' -dbcadien, WWRF, Los Angeles County Sanitation Districts
28Nov23

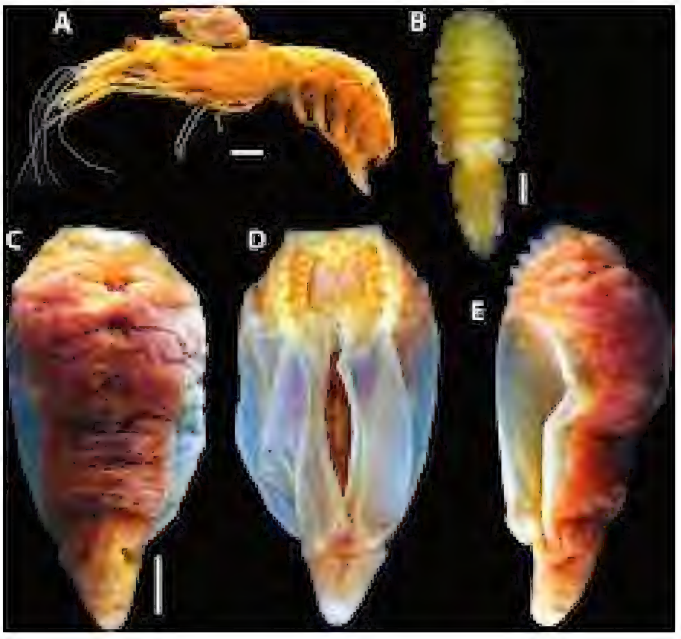
Arthropods often form symbiotic associations with other arthropods (Boxshall et al 2005). For the most part these involve ectoparasitism of a macroarthropod host by either a copepod or an isopod, or with less frequency with a decapod, a barnacle, or an amphipod. In the case considered here it is an ectoparasitic isopod and its host shrimp. Although another shrimp/isopod symbiont pair was known, based on the isopod *Holophryxus alaskensis*, isopods of the genus *Zonophryxus* were unreported in SCB waters prior to the strong "El Niño" event of 1998. Trawls by CSDLAC in southern Santa Monica Bay in late summer of 1998 yielded a number of pandalid species not previously taken there. These included *Pantomus affinis*, *Plesionika trispinus*, *Plesionika beebei*, and *Plesionika carinirostris*. Their presence in the area stemmed from northward El Niño current flow, as the normal ranges of all four were further to the south (Montagne and Cadien 2001). Along with these relatively large shrimp came an associate, a dajid isopod of the genus *Zonophryxus*. Dajids are known as 'shrimp riders' and mature specimens are evident atop the carapace of pelagic decapods. More specialized dajids are found on mysids and euphausids. No *Zonophryxus* were reported from the SCB, and as the nearest type localities of described species were several thousand kilometers to the north or south of the catch location: we assumed these isopods to be undescribed, and labeled them *Zonophryxus* sp A. Two hosts were sampled from the several southern shrimp populations: *Pandalus affinis* and *Plesionika trispinus*. A total of 30 female isopods (accompanied in several cases by males hidden under the female): 25 from *Pantomus*, and 5 from *Plesionika*. The two hosts are not the same size; the *Plesionika* being about twice the size of the *Pantomus* or more.

While the female shown seems to merely perch on the carapace of the shrimp, it is affixed with the claws of the legs, which penetrate the carapace and give the parasite a secure hold on its host. Although not well shown in the photo, the actual shape of the female is like that of a WW2 Nazi helmet: low, broad, with a slightly upturned edge, but bearing a series of serrations on its antero-ventral margin. The isopods orient head-backwards on the host, positioning the mouthparts just above the host heart. The isopods are true parasites (Boyko and Williams 2021), feeding on host fluids taken up by the piercing mouthparts. The resemblance of the female to a soldiers helmet led to the above title (with apologies to neurologist Dr. Oliver Sacks, whose book 'The Man Who Mistook his Wife for a Hat' was its inspiration). The

tenacity of the parasite; it's resistance to abandoning the host, can be seen in the specimens we collected. Most of these were still affixed to the host, having survived the trawling, retrieval, and sorting process without losing their hold.

The isopod here is in a more typical posture, more tightly adherent to the host

Even after preservation a number of the collected host/parasite pairs were still connected. This material, including hosts, was sent to Dr. Chris Boyko (Hofstra University) for examination. He is determining if they are undescribed, or represent a new occurrence of a known form far from its normal haunts. The genus is relatively small, made up of only seven species, including a new one from Peru described by Boyko and Williams in 2021. In their review of the genus they indicated that none of the currently known females were ovigerous. Fortunately, several of the females taken in Santa Monica Bay still had eggs. These were very tiny, present in the tens of thousands in gravid females, and easily lost during handling. Although I did not witness it, it is likely that these were newly lain eggs, and had not developed to the epicaridium larval stage. As an intermediate developmental stage of dajids is passed in copepods, dajids have compound life histories, with different life stages passed in association with different hosts. In this case the definitive (final) host is a decapod, while the intermediate host is a copepod. Dajids typically have one or two epicaridium larvae which infect the intermediate copepod host, and a subsequent cryptoniscid larva which infects the primary host.



Holophryxus alaskensis and host (from Boyko and Williams 2021a)

There is another dajid encountered in the SCB. It can be easily distinguished from *Zonophryxus* by the long tail, elevated off the carapace, that points forward over the shrimps head like a finger (see figure above). Although also parasitizing pelagic shrimps, *Holophryxus alaskensis* is currently known only from the pasiphaeid *Pasiphaea pacifica* (Butler 1980), and does not occur on the pandalids which host *Zonophryxus*.

Literature cited:

Boxshall, G. A., R. J. G. Lester, M. J. Grygier, J. T. Hoeg, H. Glenner, J. D. Shields and J. Lützen (2005). Crustacean parasites. IN: Marine Parasitology. K. Rohde. Victoria Australia, CSIRO Publishing**:** 123-169 of 592.

Boyko, C. B. and J. D. Williams (2021). "A review of the genus *Zonophryxus* Richardson, 1903 (Crustacea: Isopoda: Dajidae) with recognition of *Colypurus agassizi* Richardson, 1905 (Crustacea: Isopoda: Colypuridae) as a synonym of *Zonophryxus similis* Searle, 1914 and the requisite sinking of Colypuridae." Proceedings of the Biological Society of Washington **134**: 243-264.

Boyko, C. B. and J. D. Williams (2021a). "New records of species of *Holophryxus* Richardson, 1905 (Crustacea: Isopoda: Dajidae) from the Atlantic and Pacific Oceans with comments on taxonomic issues in the genus. Bulletin of the Peabody Museum of Natural History 62(2):111-121.

Butler, T. H. (1980). "Shrimps of the Pacific coast of Canada." Canadian Bulletin of Fisheries and Aquatic Sciences(202): 1-280.

Montagne, D. E. and D. B. Cadien (2001). "Northern range extensions into the Southern California Bight of ten decapod crustaceans related to the 1991/1992 and 1997/1998 El Niño events." Bulletin of the Southern California Academy of Sciences **100**(3): 199-211.

SCAMIT Treasury Summary
2022-2023

Below is the treasurer's report for 2022-2023. In 2018 we raised dues for the first time since the start of SCAMIT in 1982 from $15 to $20 for electronic memberships, $30 to $35 for hardcopy memberships, and $60 to $65 for institutional memberships. We have over 150 members across the US and worldwide. SCAMIT awarded two publication grants this past year: 1) Paul Valentich-Scott for publishing *A fossil species found living off southern California, with notes on the genus Cymatioa (Mollusca: Bivalvia: Galeommatoidea)* and 2) Tim Stebbins and Regina Wetzer for publishing *Review and guide to the isopods (Crustacea, Isopoda) of littoral and sublittoral marine habitats in the Southern California Bight*. As stipulated in our grant policy, we have **$7,446.34** or 25% of our operating budget of $29,785.36 available for publication grants this year. Please help get the word out that these funds are available. The taxonomic database support tools on our website were maintained by our webmaster.

Account Balances (as of 5/31/2023)

Checking	**$**	**29,785.36**

Income

2022-2023 Membership dues	**$**	**2,563.99**

Expenses

Newsletters (printing/postage)	$	125.41
Zoom Subscription	$	182.88
2022-2023 PO Box Renewal	$	230.00
CA Attorney General Registry of Charitable Trusts Fee	$	25.00
Paul Valentich-Scott Publication Grant	$	780.00
Tim Stebbins & Regina Wetzer Publication Grant	$	2,800.00
Total	**$**	**4,143.29**

SOUTHERN CALIFORNIA ASSOCIATION OF MARINE INVERTEBRATE TAXONOMISTS

January–April 2024 SCAMIT Newsletter Vol. 42 No. 5-6

Burrow dwellers from a Upogebiid shrimp burrow from Marin and Antokhina 2020.

This Issue

08 JANUARY 2024, MOLLUSCA – BIVALVIA PART 6, LEAD T. PHILLIPS 2
12 FEBRUARY 2024, ECHIURA AND SIPUNCULA REVIEW, OCSD 5
11 MARCH 2024, POLYCHAETA – INTRO TO ANNELIDA, LEAD B. HAGGIN 7
27 MARCH 2024, SPECIES LIST REVIEW COMMITTEE 8
22 & 29 APRIL 2024, B'23 TRAWL INVERTEBRATE VOUCHERS REVIEW 9
CONCRETE THEORY – DB CADIEN 10
ARTHROPOD PERSONALS PART 5 10
CUMACEA OF THE NEP PART 4 10
CUMANOTUS FERNALDI VOUCHER SHEET 10
LITERATURE CITED 11
SCAMIT OFFICERS 12

The SCAMIT newsletter is not deemed to be a valid publication for formal taxonomic purposes

Publication Date: January 2026

08 JANUARY 2024, MOLLUSCA – BIVALVIA PART 6, LEAD T. PHILLIPS

Attendance: Brent Haggin, Don Cadien, Wayne Dossett, Amber Von Tungeln (LACSD); Greg Lyon (CLAEMD); Tony Phillips, Kelvin Barwick (DCE); Ashley Loveland, Alison Fisher (SFPUC); Paul Valentich-Scott (Santa Barbara Museum of Natural History); Charlotte Seid (UC, San Diego); Dany Burgess (Washington State Dept. of Ecology)

UPCOMING MEETINGS

Visit the SCAMIT website at: www.scamit.org for the most current meetings announcements.

A reminder was made to those in attendance that officer nominations are still open so there is still time to get a name on the Ballot for the 2024 officers. A reminder was also made that the SCUM meeting will take place on Saturday January 27, 2024. Kelvin announced that WSM 2025 will take place in Sonora, Mexico in April of 2025. Time to start working on those travel requests.

After the business portion of the meeting, Tony began his presentation, Bivalvia of the SCB: Adult-Subadult-Juvenile (Part VI): Order Mytilida, Order Arcida, Order Ostreida, Order Pteriida, Order Pectinida, and Order Limida (as listed in SCAMIT Edition 14). This presentation concluded Tony's series of presentation on southern California Bivalves and the comparison of adult, subadult and juvenile growth series.

Tony began by discussing the Family Mytilidae in the Order Mytilida. Characteristics of the family include: 1) anterior beaks, 2) hinge plate edentate or with dysodont tubercles, 3) ligament external, frequently sunken into groove, attached to nymph, 4) periostracum usually thick, adherent, 5) sculpture of commarginal striae or mainly radial, and 6) adult byssate.
The first species to be discussed was *Brachidontes adamsianus* (Dunker, 1857), subfamily Brachidontinae. This species is typically found intertidally but Tony has found it in 20m off Avalon in gravelly sediment and in harbor Rip-Rap samples. This species ranges from Santa Cruz, CA to Peru. He compared this species to *Mytilisepta bifurcata* (Conrad, 1837), subfamily Septiferinae, to show the similarities in external morphology, and the internal structure to show the subumbonal shelf that is present in *M. bifurcata* but absent in *Brachidontes*. *Mytilisepta bifurcata* can be found intertidally to about 30m and can co-occur with *Mytilus californianus* Conrad, 1837.
Geukensia demissa (Dillwyn, 1817), subfamily Brachidontinae, was a species introduced to California in 1890. This species can be found locally from San Francisco to Newport Bay in the intertidal and was once common in the Newport Bay mudflats.

The discussion moved to the genus *Mytilus*: subfamily Mytilinae. The first species *Mytilus californianus* Conrad, 1837, can be found offshore, in higher energy environments. The next species was *M. galloprovincialis/trossolus* Cmplx. The species is currently listed as *M. galloprovincialis* Lamarck, 1819, in SCAMIT Ed. 14. The two species are distinct at the northern (*M. galloprovincialis*) and southern (*M. trossolus*) ends of their respective ranges but are hybridizing in the overlapping area of their ranges (where we collect them) and should be treated as a complex since molecular data is needed to differentiate the two species. This species complex can typically be found in lagoons and harbors. The name will be updated to *Mytilus galloprovincialis/trossolus* Cmplx in SCAMIT Ed. 15.

Publication Date: January 2026

Next up were members of the subfamily Crenellinae. *Crenella decussata* (Montagu, 1808) can be found offshore and has broad ribbing while *Solamen columbianum* (Dall, 1897) can be found in the shallow subtidal and has very fine ribbing. *Solamen megas* (Dall, 1902) was not discussed.

Gregariella coarctata (Carpenter, 1857), subfamily Musculinae, was discussed next. This species can be found from the intertidal to about 90m. This species can occur in large bisal mats. *Gregariella semigranata* (Reeve, 1858), a Mediterranean species, was shown for comparison to the local species.
Musculus pygmaeus Glynn, 1964, was shown next. This species is not known to occur south of Morro Bay and was possibly added to the SCAMIT list in error. This species was discussed in the Micro-Bivalvia of Southern and Central California workshop hosted by Scripps Institution of Oceanography in 2004 but was likely brought by attendees from the Santa Cruz area. We will continue to attempt to track this species down but it will be removed from SCAMIT Ed. 15 if a local record cannot be confirmed.

Arcuatula senhousia (Benson in Cantor, 1842), subfamily Arcuatulinae, is an invasive species found in bays and harbors. It has been encountered locally from Callagues to San Diego and has been recorded as far south as Ensenada, Mexico. This species can occur in large bisal mats. *Xenostrobus* sp., also subfamily Arcuatulinae, is another introduced species. Members of this genus are also invasives in the Mediterranean Sea. This species has distinctive coloration and lacks anterior and posterior ribbing. Tony has found this species locally from Goleta Slough, Santa Barbara to Newport, and recently down to Batiquitos Lagoon in San Diego. He also recently found this species near the Chevron outfall in Santa Monica Bay so it appears that it is spreading offshore. *Dacrydium pacificum* Dall, 1916, subfamily Dacrydiinae, can also be found to occur in large bisal mats.

Members of the subfamily Lithophaginae were next to be discussed. *Adula diegensis* (Dall, 1911) is a non-boring, intertidal species. Not currently on the SCAMIT species list, *Adula californiensis* (R. A. Philippi, 1847), is a boring species that resembles *A. diegensis* but is more cylindrical. *Adula gruneri* (R. A. Philippi, 1851) is a soft-rock boring species that has been reported by SCAMIT members and is listed in SCAMIT Ed. 14. This species also has a cylindrical appearance.
Leiosolenus aristate (Dillwyn, 1817) is an intertidal species found from Avalon to Chile. This species is known to bore into shale, soft rocks and shells. *Leiosolenus plumula* (Hanley, 1844) can be found intertidally to about 40m, from Monterey to Ecuador.

Subfamily Modiolinae has six species represented locally on the SCAMIT list, but only four were discussed. *Amygdalum pallidulum* (Dall, 1916) has been reported from central California to Columbia from 40-400m. *Modiolatus neglectus* (Soot-Ryen, 1955) can be found from central California to Peru from 15-110m. This species has an anterior that protrudes quite a bit and has long, simple periostracal setae. *Modiolus capax* (Conrad, 1837) can be found intertidally and has an even anterior and serrate periostracal setae. *Modiolus sacculifer* (Berry, 1953) has an anterior that barely protrudes, short and simple periostracal setae and typically has adherent sand grains. *Modiolus modiolus* (Linnaeus, 1758) and *Modiolus rectus* (Conrad, 1837) were not discussed. Attendees were reminded of the SCAMIT protocol - specimens <2mm should be reported as Modiolinae.

The final species discussed in the Family Mytilidae was an unknown. This strange animal was originally reported and photographed by Kelvin Barwick from a station in San Diego and was

Publication Date: January 2026

later encountered again by Tony from the San Luis Rey River. The anterior ribs of this species differ from those found in *Arcuatula*. This species has ribs that start medially and extend dorsally while *Arcuatula* has ribs that start medially but extend ventrally. It was decided that this species should be given a provisional designation and it was named Mytilidae sp 1 Phillips, 2024 § during the meeting. This species has possibly also been encountered in ISS and LA/LB Rip-Rap samples but confirmation of this is still needed.

The discussion moved on to the Order Arcida, beginning with the Family Arcidae. *Anadara multicostata* (G. B. Sowerby I, 1833), Subfamily Anadarinae, can be found from San Diego to Panama while *Anadara tuberculosa* (G. B. Sowerby I, 1833) can be found from Mission Bay, San Diego to Peru. *Acar bailyi* Bartsch, 1931, Subfamily Arcinae was not discussed.

Next was the Family Glycymerididae. *Glycymeris septentrionalis* (Middendorff, 1849) has a less squared-off appearance when compared to *Anadara* species. In the Family Limopsidae, *Limopsis panamensis* Dall, 1902 has been reported locally from Anacapa Island. In the Family Philobryidae is *Philobrya setosa* (Carpenter, 1864) which has been reported from LA/LB Rip-Rap Samples. *Arcopsis solida* (G. B. Sowerby I, 1833), Family Noetiidae was not discussed.

Order Ostreida, Family Ostreidae. *Magallana gigas* (Thunberg, 1793) is an invasive species that has a west coast range from Alaska to Baja California, Mexico. This species lacks chomata. *Ostrea lurida* Carpenter, 1864, ranges from Alaska to Bahia Magdalena, Baja California Sur, Mexico. This species can be found in the intertidal to shallow subtidal and can be distinguished from *M. gigas* by the presence of chomata. Two recent papers were mentioned by Tony that discuss the re-instatement of *Ostrea lurida* as a valid species and restricting its range to north of central Baja California. The first is Polson M.P., Hewson W.E., Eernisse D.J., Baker P.K. & Zacherl D.C. (2009) You say Conchaphila, I say Lurida: Molecular evidence for restricting the Olympia Oyster (*Ostrea lurida* Carpenter 1864) to temperate western North America. *Journal of Shellfish Research* 28(1): 11-21. The second was Raith M., Zacherl D.C., Pilgrim E.M. & Eernisse D.J. (2015). Phylogeny and species diversity of Gulf of California oysters (Ostreidae) inferred from mitochondrial DNA. *American Malacological Bulletin.*3 3(2): 1-21.
Atrina oldroydii Dall, 1901, Family Pinnidae was not discussed.

Next up for discussion was the Order Pteriida, Family Pteriidae. *Pteria sterna* (Gould, 1851) is a warm-water species. Don Cadien (LACSD) mentioned that species has been found growing on Gorgonians in the shallow waters (<15m) off Palos Verdes. Family Isognomonidae, *Isognomon janus* Carpenter, 1857 can be found in the intertidal to about 20m and ranges from San Diego to Peru.

Next was the Order Pectinida. First of the Order discussed was the Family Anomiidae. *Anomia peruviana* d'Orbigny, 1846, has 3 attachment scars internally for the adductor muscle while *Pododesmus macrochisma* (Deshayes, 1839), has only 2 attachment scars.

The Family Pectinidae. See Coan, E. V. & Valentich-Scott, P. (2012), for detailed descriptions of the various genera of Pectinidae. *Delectopecten vancouverensis* (Whiteaves, 1893), Subfamily Camptonotinae, is a deeper water species and can sometimes be found attached to crab legs. Subfamily Pectininae is represented locally by *Euvola* cf *perulus* (Olsson, 1961) and *Leopecten diegensis* (Dall, 1898). *Leopecten diegensis* ranges from Bodega Bay to Cabo San Lucas, Mexico and has auricles that are "mostly" even. Tony has also encountered a currently unknown juvenile pectinid. He suspects it is either a juvenile *Leptopecten* or possibly introduced. This species has a "bubbled" valve and the denticles are longer and less rounded than local *Leptopecten.*

Publication Date: January 2026

Members of the Subfamily Chlamydinae were discussed next. *Argopecten ventricosus* (G. B. Sowerby II, 1842) has broad radial ribs and variable pigmentation. *Chlamys hastata* (G. B. Sowerby II, 1842) is a shallower water species with uneven auricles. *Crassadoma gigantea* (J. E. Gray, 1825) can be found from the intertidal to around 80m and ranges from Alaska to Mexico. *Chlamys* and *Crassadoma* can be difficult to differentiate at smaller sizes. *Leptopecten latiauratus* (Conrad, 1837) is known from bays and harbors from Pt. Reyes to Cabo San Lucas, Mexico and can be found attached to kelp holdfasts in offshore environments. It is characterized by uneven, ribbed auricles.

The Family Propeamussiidae finished off the discussion of the Order Pectinida. *Cyclopecten catalinensis* (Willett, 1931) can be found in deeper waters (30-350m) and was compared to *Cyclopecten bistriatus* (Dall, 1916). *Cyclopecten benthalis* Grau, 1959 and *Cyclopecten zephyrus* Grau, 1959 were not discussed.

The final group to be discussed was the Order Limida, Family Limidae. *Limaria hemphilli* (Hertlein & Strong, 1946), Subfamily Liminae, the juveniles have smoother ribbing than the larger subadults and adults of the species.

After Tony's presentation Paul Valentich-Scott (SBMNH) mentioned that he currently has a Zotero database with around 800 references that he and Coan used for their 2012 manuscript and other resources. He has been adding pdfs of the papers to this database and offered to share the resource with interested parties. Send Paul an email, pvscott@sbnature2.org, to gain access. Zotero is a free-to-use bibliographic database similar to EndNote and will need to be installed on your computer to access this resource. Contact Paul for more information.

12 FEBRUARY 2024, ECHIURA AND SIPUNCULA REVIEW, OCSD

Attendance: Megan Lilly, Wendy Enright, Zoë Scott, CSD; Brent Haggin, Don Cadien, Norbert Lee, LACSD; Laura Terriquez, Ben Ferraro, OCSD; Greg Lyons, Jennifer Smolenski, Erin Oderlin, CLAEMD; Rod Velasquez, Angelica Zavala Lopez, MTS; Matt Hill, Ecoanalysts; Dany Burgess, WA Dept of Ecology; Robin Gartman, retired.

The Meeting was called to order and started with round-robin introductions including several people tuning in via Zoom.

The business meeting began with a reminder to submit nominations for SCAMIT officers. Erin wanted to let people who aren't on the Bight Benthics committee know that two subcommittees have been formed focusing on the BRI, SQO, and M-AMBI ecological health scores. One will be for taxonomic consistency (how and if we assign p-codes as new taxa are encountered or old taxa are modified) and one will be for programmatic calculation consistency. Discussion ensued regarding the history of BRI, touched on SQOs and the need to do these recalibrations more often than has been done in the past.

After a bit more digression regarding Megan's training style, we turned to the Echiura. Megan reviewed best practices for dissection, emphasizing the delicacy of the internal structures needed to identify these organisms.

- Look for external setae. If present, start your cut on the opposite side of the animal; OR, find the ventral nerve cord (VNC) and always cut on the opposite side of the animal
- If present, note the shape of the proboscis

Publication Date: January 2026

- Look externally for features such as a giant nephridiopore
- Once the animal is open, use a pipet to **gently** blow fecal pellets clear of the internal aspect of the animal
- Anal vesicles can be especially difficult to determine due to their fragile nature and tendency to "disappear"

Megan showed more photos of these important features and discussed the possibility of external morphological variability (i.e., smooth vs papillated) for some species. We reviewed how to look for setae and examined the nephridia and anal vesicle drawings from the MMS Atlas chapter on Echiura. Megan then demonstrated how to access resources on the SCAMIT website using the Newsletters and Tools. The Echiura character table in the toolbox was reviewed. In general, when unable to identify an animal, it is left at Echiura.

Moving on to the Sipuncula, Megan gave a quick review of their anatomy highlighting key characters.

- Retractor muscles (number and form)
- Microvilli presence/absence
- Introvert tentacles (if present)
- Nephridia form and quantity
- Body wall muscle bands (visible? If so, sometimes will need to count)

The Sipuncula character table is available in the Toolbox. Be sure to look at external characters before dissecting; note any papillae or hooks on the introvert (if present), body wall muscles if visible, length of the introvert compared to the rest of the body. When possible, cut opposite the ventral nerve chord. Tent the skin away from the internal structures before making the first cut. Determine the nephridia, retractor muscles, and microvilli. Although the spindle muscle may be diagnostic, it is often broken. Likewise, the body wall muscle structure is difficult to see. The counting convention for Sipuncula is slightly different than other animals as the body, rather than the feeding structures, is used.

Other than in-house notes and the Sipuncula table available in the Toolbox, Megan occasionally uses Cutler 1994 and The Light and Smith Manual (Carlton 2007) for assistance with identifying Sipuncula.

There was a brief side discussion on the invasion of *Grimothea planipes* (Stimpson, 1860) during the last major ENSO event in 2016 that lasted for several years. Presumably these animals impacted the benthos, either directly through predation and bioturbation or indirectly through displacement and competition for resources.

More side notes ensued regarding interesting critters brought up during the Bight '23 trawl activities of the previous summer.

That concluded the hybrid portion of the meeting as we broke for lunch and cake for Megan. A small celebration of Megan's impending retirement ensued and she was very touched by the cards and gifts given to her by the taxonomists present.

After a convivial lunch, the group headed to the lab to examine specimens and practice dissections.

1. CLAEMD B23-12136 20m Long Beach Harbor; a stubby little Sipuncula with a spiny introvert but no tentacles. Megan demonstrated how to cut such a tiny animal (helpful to have 2mm iris scissors). This animal had no internal structures, so it was left at Sipuncula.
2. CLAEMD also brought their 1976 voucher of *Themiste (Themiste) hennahi* Gray, 1828, Paradise Cove (no depth given and apparently this locality has a wide range). Jen Smolenski practiced a dissection on the rather large animal, first noting the presence and form of the tentacles. Although the tentacles were distinctive enough to key out the animal using Cutler, the internal structures were also confirmed.
3. CSD B23-12284, Anaheim Bay, 8/18/2023, 9m; Zoë Scott took a turn with the iris scissors, opening up a large Echiura to reveal the dendritic anal vesicles of *Nellobia eusoma*.

There were a few random echinoderms that got snuck onto the teaching scope and with that, the meeting concluded.

11 MARCH 2024, POLYCHAETA – INTRO TO ANNELIDA, LEAD B. HAGGIN

Attendance: Brent Haggin, Cristina Fuentes, Mac Power (LACSD); Inez Mangino (UCSB); Erin Oderlin, Greg Lyon (CLAEMD); Kelvin Barwick (DCE); Ashley Loveland, Alison Fisher, Diane O'Donohue (SFPUC); Leslie Harris (LACNHM); Veronica Rodriquez, Ricardo Martinez, Adam Webb, Maiko Kasuya (CSD); Ernie Ruckman (OCSD); Rod Velasquez (MTS); Dany Burgess (Washington State Dept. of Ecology); Amanda Martinez.

A reminder was made to those in attendance that a SLRC meeting was scheduled for March 27 and that officer ballots were going out soon.

After the business portion of the meeting Brent began his presentation - Introduction to Annelida. This presentation was meant as an overview of the Phylum Annelida for the many new taxonomists across the various agencies.

The presentation began by loosely defining what an annelid is and their history throughout the fossil record. The presentation then moved into the many aspects of annelid biology including feeding, reproduction and growth, as well as the basic anatomy of an annelid worm. Also covered were various laboratory techniques, such as dissection and staining using different dyes to enhance different anatomical features. It finished with a taxonomic review of the Phylum Annelida, including the recently incorporated groups of Echiura and Sipuncula. While lacking obvious external segmentation and chaetae, the developmental affinities and molecular evidence for inclusion of the Sipuncula was discussed. The Sipuncula show developmental similarities to the Terebellida and molecular data shows support for the Sipuncula as a sister-group to the Amphinomida. The molecular evidence for inclusion of the Echiura within the Annelida was also discussed, and while there is strong support for the Echiura as the sister-group to the Capitellidae, the SCAMIT SLRC has left the Echiura as a subclass within the Polychaeta for now.

Though no longer identified to species, the characteristics of Class Clitellata (earthworms and leeches) were also discussed. The Hirudinea, or leeches, are often encountered as fish parasites,

have suckers at each end and lack chaetae. The Oligochaeta typically have 1 – 2 pair of bifid chaetae and a clitellum in mature specimens. Some recent molecular evidence suggests that the Clitellata are a highly derived subtaxon of Polychaeta and should be placed within Sedentaria. This position has not yet been accepted by SCAMIT or WoRMS.

The bulk of the presentation focused on the taxonomy of the Class Polychaeta. It was presented based on the taxonomic groupings allowing similarities within the groups to be emphasized. Throughout the presentation, the type localities of the organisms were also discussed, bringing to light the vast number of polychaete species that were described from outside of the NEP (currently around 25%), but whose names are currently used in the literature and by SCAMIT.

Some of the key items that were discussed were the status of some of the locally used species names. Leslie Harris (LACNHM) mentioned that *Euchone incolor* Hartman, 1965 is not found locally. *Euchone incolor* was originally described from New England and has a different stain pattern than our local species. This species should be given a provisional designation (hopefully by SCAMIT Ed. 15). *Euchone barnardi* Reish, 1968 was described from Bahía de Los Angeles, Baja California, Mexico and was synonymized with *Euchone incolor* by Banse in 1970. This species should be looked at as a possible local replacement for *Euchone incolor*.

Leslie also suggested moving *Platynereis bicanaliculata* (Baird, 1863) into a complex. This organism shows a high degree of variability in the chaetae as well as in pigmentation.
Also related to Nereididae, Leslie recommended making jaw dissections laterally rather than dorsally or ventrally to avoid damaging the jaw structure.

Moving forward, we should stop using *Scoloplos armiger* Cmplx and begin using *Scoloplos* sp LA2 Haggin, 2017 §; *Scoloplos* sp LA3 Haggin, 2017 § or *Scoloplos* sp LA4 Haggin, 2018 §. Voucher sheets for each species as well as the most up-to-date key can be found on the SCAMIT toolbox. *Scoloplos armiger* Cmplx will be removed from the SCAMIT species list beginning with Ed. 15.

Brent's list of recommended polychaete literature is attached to this newsletter.

27 MARCH 2024, SPECIES LIST REVIEW COMMITTEE

Attendance: Brent Haggin, Don Cadien (LACSD); Erin Oderlin, Jennifer Smolenski (CLAEMD); Kelvin Barwick, Tony Phillips, Dean Pasko (DCE); Leslie Harris (LACNHM); Andrew Davenport, Wendy Enright, Katie Beauchamp, Stephanie Smith, Zoë Scott (CSD).

Kelvin was nominated and elected as chair. While accepting this position, Kelvin expressed his desire to step away from the position as SLRC Chair after the completion of Ed. 15.

Phyla leads were chosen/volunteered and secondary assignments were made.

The timing of future Species List publications was decided. SCAMIT Ed. 15 will be published in 2026. Going forward, two species lists will be published every 5 years. Edition 16 will be published in 2028 and will be the naming basis for Bight '28. An interim list, Edition 17, will be published 3 years later in 2031. This will help to keep changes to a manageable number for each publication. This cycle will continue every 5 years, with even Species Lists Editions used as the basis for ongoing Bight sampling.

Erin Oderlin (CLAEMD) proposed moving the publication date up to June 1 rather than July 1 to allow database managers time to update their databases before the summer sampling begins. This proposal was adopted and will be implemented with Edition 15.

The use of the "§" character in the species list was clarified. The "§" character is used to denote a provisional authorship of an unpublished species. If a "cf" or "nr" is used in the species list, the original authority should be used, not SCAMIT. The "cf" or "nr" should not be italicized within the species list.

The next topic of discussion was that of the cosmopolitan species concept. This concept has changed recently, and it is now widely accepted that most cosmopolitan species are anthropogenic in nature and that very few truly cosmopolitan species exist. This is something that needs to be considered when adding new taxa and to question current and historic practices based on new information. A good way to assess this situation is to ask the question "If it was described from Greenland, how did it get here?" Leslie mentioned that deep-sea polychaetes have been found to be widely distributed due to "deep-sea storms" that can transport larvae great distances.

The species list database was discussed again and a bit of progress was made. It was discovered and decided that we can use the ITI structure (similar to how WoRMS handles things) for our database. This still leaves us with the problem of how to deliver the product, how to maintain the database with a volunteer staff, how to fund the database and can we get SCCWRP to host while we maintain control?

22 & 29 APRIL 2024, B'23 TRAWL INVERTEBRATE VOUCHERS REVIEW

The only minutes from 22 April is that an *Aphrodita castanea* Moore, 1910 voucher was verified for ABC and an *Aphrodita japonica* Marenzeller, 1879 was verified for CLAEMD. Some anthozoa vouchers were also examined.

At the April 29th meeting we found a good character to distinguish *Stylasterias forreri* (deLoriol, 1887) from *Sclerasterias heteropaes* Fisher, 1924. The color, typical habitat, and arm constrictions are decent secondary characters, but a reliable hard character that can be seen even on small specimens (with a hand lens) deals with the inferomarginal spines. See Fisher 1928 Part 2, page 94 & 95, the couplets at the very top of each page:

- For *Scleratserias*: only the outer of the 2 inferomarginal spines carries a cluster of crossed pedicellariae. There is a half circle of pedicellariae on the aboral half of the more aboral inferomarginal spine. It's not a full crown like the rest of the spines on the aboral surface.
- For *Stylasterias*: the inner **and** outer inferomarginal spines carry a cluster of crossed pedicellariae. There are half circles of pedicellariae on the aboral half of both inferomarginal spines.

As a reference point, the inferomarginal spines are the two spines on the last plate before the oral grooves. They appear to make a "V".

From SCAMIT newsletter Vol 41 no 5&6: *Sclerasterias heteropaes* are usually in shallow water on cobble/mixed bottoms (LACSD sees them commonly). They have a slight constriction to the arm just before the disc that CLAEMD uses as a quick character. *Stylasterias forreri* are more commonly found in association with kelp beds but CSD has found them associated with their thermistor anchor in 100m of water.

Publication Date: January 2026

CONCRETE THEORY – DB CADIEN, WWTP, CARSON, CA., 10 OCT 2023

I have been fortunate to have a number of memorable experiences during my life. As a student of nature for nearly seven full decades I have observed many events over the years that others may not have experienced. One such took place in 1963, at age 17, on the north shore of Viti Levu Island, Fiji. I was traveling with my parents and we were staying at a sea-side hotel laid out as a central set of communal buildings surrounded by gardens studded with individual cabins. The gardens were lush and consisted of flower beds, shrubbery, and grassy areas. One evening we were scheduled to partake in a Kava Ceremony. I, as a non-drinker, quickly lost interest and wandered off into the warm humid night. There I discovered a rather remarkable scene. As do most such hotels, this one had a series of large electronic bug-zappers on the grounds to reduce the number of flying insects for patron comfort. The device was elevated on a pole about nine feet off the ground and was industrial-sized. As insects hit its energized wires they quickly sizzled then popped off into the night. Taking full advantage of this was a large group of cane toads (at the time *Bufo marinus*). The species is not native to the region and was introduced from the Caribbean to Fiji in 1936 as a biological control agent. It had strongly proliferated, and the many aggressive and poisonous cane toads were displacing the native amphibians. Such was the case here. Arrayed around the post in circles (three I could see, perhaps more) at increasing distances from the bug-zapper these toads sat, with only slight position jostling. They had organized themselves into a competitive hierarchy, with the largest toads in the first ring, medium sized toads in the second, and young toads relegated to the distant third. As the freshly toasted insects popped off the electrified grid they flew into the waiting maws of these toads, with the choicest and largest morsels being garnered by the first ring, and the size (but probably not the frequency) of toasted treats declining with increasing distance. I stood in wonder watching this spectacle, finding it much more engaging than the kava ceremony taking place some yards away. It was an almost perfect manifestation of a competitive dominance hierarchy, and one reestablished each night after sunset when the illuminated traps were turned on. The actual competition had transpired before my arrival but was probably quite fierce as the prize was a delicious hot meal of toasted highly proteinaceous bugs. It made ecological theory quite concrete for me, a lesson retained to this day and a treasured memory. The conceptual framework of such theory was recently reviewed by Tibbetts et al 2021(The establishment and maintenance of dominance hierarchies, Philosophical Transactions of the Royal Society B, 377(20200450): 11pp. While learning from published papers and books can be enjoyable, direct observation of nature is a better and more entertaining teacher.

ARTHROPOD PERSONALS PART 5

Attached, please see Don Cadien's latest installment in his Arthropod personals series

CUMACEA OF THE NEP PART 4

Attached, please see Don Cadien's latest on the Cumacea of the NEP

VOUCHER SHEET

Please see the attached voucher sheet on *Cumanotus fernaldi* by Barwick and Cadien

LITERATURE CITED

Carlton, J.T. 2007. The Light and Smith Manual Intertidal Invertebrates from Central California to Oregon Fourth Edition, Completely Revised and Expanded, Fourth Edition. University of California Press, Pp 545-618.

Coan, E. V. & Valentich-Scott, P. (2012). Bivalve seashells of tropical West America. Marine bivalve mollusks from Baja California to northern Peru. 2 vols, 1258 pages.

Cutler, Edward B., 1994. The Sipuncula: Their Systematics, Biology, and Evolution. Cornell University Press. 453 pp.

Fisher, W.K. 1928. Asteroidea of the North Pacific and Adjacent Waters. Part 2. Forcipulata. Bulletin of the United States National Museum. 76: 1–245.

Marin, I. N. and T. I. Antokhina (2020). "Hidden burrow associates: macrosymbiotic assemblages of subtidal deep-burrowing invertebrates in the northern part of the Sea of Japan." Marine Biodiversity 50(50): 22pp.

Pilger, John F., 1996. Echiura. *In*: Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. Volume 14. Miscellaneous Taxa. Eds. James A. Blake, Paul H. Scott and Andrew Lissner. Santa Barbara Museum of Natural History. Pp: 67-79.

Polson M.P., Hewson W.E., Eernisse D.J., Baker P.K. & Zacherl D.C. (2009). You say Conchaphila, I say Lurida: Molecular evidence for restricting the Olympia Oyster (*Ostrea lurida* Carpenter 1864) to temperate western North America. *Journal of Shellfish Research* 28(1): 11-21.

Raith M., Zacherl D.C., Pilgrim E.M. & Eernisse D.J. (2015). Phylogeny and species diversity of Gulf of California oysters (Ostreidae) inferred from mitochondrial DNA. *American Malacological Bulletin.*3 3(2): 1-21.

Publication Date: January 2026

Please visit the SCAMIT Website at: www.scamit.org

SCAMIT OFFICERS

If you need any other information concerning SCAMIT please feel free to contact any of the officers at their e-mail addresses:

President	Brent Haggin	(562)908-4288 x 5672	bhaggin@lacsd.org
Vice-President	Leslie Harris	(213)763-3234	lharris@nhm.org
Secretary	Megan Lilly	(619)708-8979	megansea8@yahoo.com
Treasurer	Erin Oderlin	(310)648-5477	erin.oderlin@lacity.org

SCAMIT is a 501(c)(3) charity. The newsletter is published every two months and is distributed freely to members in good standing. Membership is $20 for an electronic copy of the newsletter, available via the web site at www.scamit.org, and $35 to receive a printed copy via USPS. Institutional membership, which includes a mailed printed copy, is $65. All correspondences can be sent to the Secretary at the email address above or to:

SCAMIT
PO Box 50162
Long Beach, CA 90815

Arthropod Personals – Seeking Companion?
Part 5 – Gimme Shelter! Housing the homeless.- dbcadien. WWRF. Los Angeles County Sanitation Districts, 30Nov23

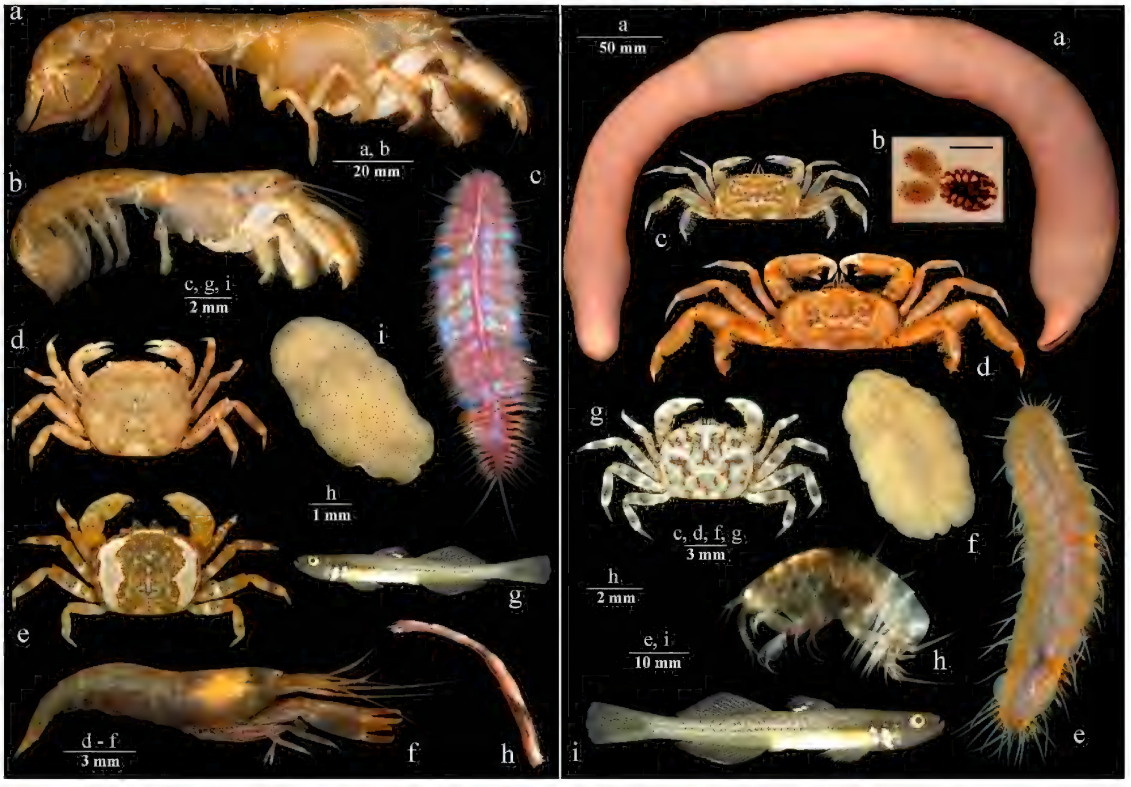
Biogenic structures such as coral reefs or *Sabellaria* reefs offer shelter to a myriad of other animals. So, on a smaller scale, do the burrows of animals. Among the most notable burrowers are thalasinid shrimps such as the ghost shrimps in the genus *Neotrypaea*. These 'ecosystem engineers' are vigorous and active, frequently providing the majority of the

Thalassinid burrow openings and ejecta mounds on an intertidal mud-flat: the major source of structure in the habitat [inset is the responsible organism, *Callichirus kraussi*] (from Pillay 2019)

sediment turnover and mixing essential to elemental cycling in the benthos. They make burrows in soft sediments for their own use, but along the way manage to altruistically benefit a number of other organisms. The burrows may be quite complex (Nickell and Atkinson 1995), with design and function varying between different species in different genera. In the waters of the SCB we have several species of *Neotrypaea* who construct such burrows, primarily *N. californiensis*, but also *N. affinis* (now *N. biffari*) and *N. gigas*. Several of these species have fish associated with their burrows as well as various invertebrates. The arrow goby *Clevelandia ios* is frequently encountered in bay burrows of *N. californiensis* (Hoffman 1980, 1981), while the blind goby *Typhlogobius californiensis* is associated with *Neotrypaea affinis* (MacGinitie 1939). The shrimp benefits from the presence of *Typhlogobius*, which warns it of the approach of predators, creating a true mutualism with benefits to each associated species. The case of *Clevelandia* is less clear, as shrimp are known to chase the fish from their burrows, particularly when there is more than one resident shrimp. While the fish is in the burrow it is protected from predators, and thus benefits. Any benefits to the shrimp are unclear, and this is not apparently a mutualist symbiosis like the other local fish-shrimp one. A nutritional benefit to the shrimp is demonstrated in a similar fish/shrimp symbiosis between a goby and a burrowing alpheid shrimp (Kohda et al 2017) and this could potentially also occur in the *Clevelandia/Neotrypaea* relationship.

We have never encountered this fish/shrimp symbiosis in our sampling, but we frequently find other arthropods known to associate with thalassinids in their burrows in benthic grabs. These are cyclopoid copepods of the family Clausidiidae. Three species are represented on the SCAMIT Ed. 14 list, *Clausidium vancouverensis, Goodingius subadhaerens*, and *Hemicyclops thysanotus* (see Light and Hartman 1937, Gooding 1960 and Kim 2007). Females of all three species are illustrated on Plate 210 of Cordell (2007). While these copepods occur free within the burrow, they are more usually encountered on the surface of the shrimp, particular in the branchiae (Haddon 1912). Other large invertebrates also construct burrows which offer protection to other species, most prominently large echiuroid worms such as *Urechis caupo*, the 'innkeeper worm'. Both arthropod and other burrows in the waters around Japan, their makers

and associates, have recently been examined (Marin and Antokhina 2020). The diversity in symbionts laid out by those authors are largely echoed in our own waters. For instance, Hoffman 1980 listed many species found in the burrows of *Neotrypaea* (then *Callianassa*) *californiensis*, largely paralleling the lists proved by Marin and Antokhina with the exception of polychaetes. A somewhat later list (Campos et al 2009) added additional burrow dweller records. Scaleworms seem to be a prominent component of the burrow associates of many large burrowing invertebrates, in some cases proving to be new taxa rather than known species which have chosen to live with the burrower.



Burrow dwellers from a upogebiid shrimp burrow (left) and an echiuran worm burrow (right)
Including crabs, alpheid shrimp, an amphipod, a copepod, fish, flatworms, polychaetes, and a phoronid
(from Marin and Antokhina 2020)

Helping the homeless and keeping the seafloor 'neat' are not the purposes of the burrows these organisms make. They are for their own protection, and in a number of cases, nutrition. Thalassinid shrimps such as *Neotrypaea* use their burrows in a number of different ways for food gathering (see Abed-Navandi and Dworschak 2005, and Abed-Navandi et al 2005).) These 'societies' living together within the boundaries of a relatively small space are complex. Symbionts no doubt react to each other as well as to the host. Some of the members of these symbiotic communities seem specialized, occurring only within them, or virtually always within them. In other cases more broadly ranging less specialized taxa are included among the members. In these multispecies symbiotic aggregations most of the interaction is probably between the large burrow constructing host and the smaller commensal symbionts. Whether or not the commensals interact either positively or negatively with each other as well is a complexity awaiting discovery. Within the narrow confines of many tubes or burrows, positional conflicts between commensals vying for space seem likely. They structures are almost never simple U shaped constructs, and physical attributes (particularly oxygenation) vary spatially within them. Physical tolerances likely differ between commensals, and they each may seek particular portions of the overall aggregation which are most favorable to them. Much research remains to be done before the systems are sufficiently understood to be modeled. New technologies are already playing a part, with burrow water being analyzed for eDNA to better catalog the species resident within. Our remote samplers only snatch a small portion of the whole, returning a glimpse into this communal world, but not a picture of the whole.

Cited Literature::

Abed-Navandi, D. and P. C. Dworschak (2005). "Food sources of tropical thalassinidean shrimps: a stable-isotope study." Marine Ecology Progress Series **291**: 159-168.

Abed-Navandi, D., H. Koller and P. C. Dworschak (2005). "Nutritional ecology of thalassinidean shrimps constructing burrows with debris chambers: the distribution and use of macronutrients and micronutrients." Marine Biology Research **1**: 202-215.

Campos, E., A. R. de Campos and I. Manriquez. (2009). "Intertidal thalassinidean shrimps (Thalassinidea, Callianassidae and Upogebiidae) of the West Coast of Baja California, Mexico: annotated checklist, key for identification, and symbionts." Crustaceana **82**(10): 1249-1263.

Cordell, J. R. (2007). Commensal and Parasitic Copepoda (Cyclopoida, Siphonostomatoida, and Monstrilloida). Pp. 464-475 IN: Carlton, James T. (ed.) The Light and Smith Manual Intertidal Invertebrates from Central California to Oregon, Ed. 4. Berkeley, California, U.S.A., University of California Press.

Gooding, R. U. (1960). "North and South American copepods of the genus *Hemicyclops* (Cyclopoida: Clausidiidae)." Proceedings of the United States National Museum **112**(3434): 159-195.

Haddon, K. (1912). "*Hersilia* (*Clausidium*) *vancouverensis*." Annals and Magazine of Natural History, 8th Series **10**: 84-87.

Hoffman, C. J. (1980). Associative behavior of the Arrow Goby, *Clevelandia ios* (Jordan and Gilbert) and the ghost shrimp, *Callianassa californiensis* Dana. Biology. Newport, Oregon, University of Oregon. **MS:** 83pp.

Hoffman, C. J. (1981). "Associations between the Arrow Goby *Clevelandia ios* (Jordan and Gilbert) and the ghost shrimp *Callianassa californiensis* Dana in natural and artificial burrows." Pacific Science **35**(3): 211-216.

Kim, I.H. (2007). *Giardella ricoensis* n. sp. from the West Indies and the proposal of the new genus *Goodingius* (Copepoda: Cyclopoida: Clausidiidae). Korean Journal of Systematic Zoology 23(2): 127-133.

Light, S. F. and O. Hartman (1937). "A review of the genera *Clausidium* Kossman and *Hemicyclops* Boeck (Copepoda, Cyclopoida) with the description of a new species from the Northeast Pacific." University of California Publications in Zoology **41**(14): 173-188.

Kohda, M., H. Yamanouchi, T. Hirata, S. Satoh and K. Ota (2017). "A novel aspect of goby-shrimp symbiosis: gobies provide droppings in their burrows as vital food for their partner shrimps." Marine Biology **164**(22): 7pp.

MacGinitie, G. E. (1939). "The natural history of the blind goby, *Typhlogobius californiensis* Steindachner." American Midland Naturalist **21**(2): 489-505.

Marin, I. N. and T. I. Antokhina (2020). "Hidden burrow associates: macrosymbiotic assemblages of subtidal deep-burrowing invertebrates in the northern part of the Sea of Japan." Marine Biodiversity **50**(50): 22pp.

Nickell, L. A. and R. J. A. Atkinson (1995). "Functional morphology of burrows and trophic modes of three thalassinidean shrimp species, and a new approach to the classification of thalassinidean burrow morphology." Marine Ecology Progress Series **128**: 181-197.

Pillay, D. (2019). "Ecosystem engineering by thalassinidean crustaceans: response variability, contextual dependencies and perspectives on further research." Diversity **11**(64): 20pp.

Cumacea of the NEP: equator to Aleutians and intertidal to abyss

Part 4. The **Family Lampropidae**

dbcadien 6 November 2006 (revised 31 October 2011)

The cumacean family Lampropidae is the second of 5 families belonging to the clade of forms with articulated telsons. It, along with the families Diastylidae, Ceratocumatidae, and Gynodiastylidae form this clade. The Pseudocumatidae, the sister taxon to all other cumaceans, also has an articulated telson. The Lampropidae is smaller than the Diastylidae having only 58 species distributed among 13 genera in the Crustaceorum Catalogus treatment (Băcescu 1988). Gerken (2018) in a worldwide revision, added another 12 genera and 23 species. In the NEP only seven genera of lampropids are known to occur. with 20 species; a qyarter of which are provisionals. Like the diastylids, the lampropids are primarily a cool water and/or deep water group (Day 1978). Most of the local lampropids were in the genus *Lamprops*, which is a generally shallow-water genus of the northern Hemisphere (Day 1978). This genus was split into a number of genera by Gerken (2018), three of which occur in the NEP, *Lamprops (ss)*, *Alamprops*, and *Phallolamprops*.The genus *Mesolamprops* is also primarily shallow-water, while *Hemilamprops* and *Paralamprops* are deeper dwelling. The family is sexually dimorphic along the lines of most cumacean families. Unfortunately, the taxonomy at the generic level is dominated by separations based on adult male morphology. This makes it impossible to place females and juveniles of some species in the appropriate genus, although specific identity may be clear.

It should be noted that under ICZN Article 30.1.4.3. all generic group names ending in -ops are to be treated as masculine. In consequence, to retain agreement in gender, all species level names originally proposed as feminine or neuter must be recast in masculine. For species in this family, where most generic names end in -ops, the appropriate masculine ending for species level names is –us rather than –a. All names have been emended below to conform to this article.

NEP Lampropidae from McLaughlin et al (2005) augmented by known provisional taxa. *= Taxa on the SCAMIT Ed 6 list. Valid taxa bolded, synonyms not.

Lampropidae

Alamprops augustinensis (Gerken 2005) – Cook Inlet, Alaska; 0-1m

***Alamprops carinatus** (J. F. L. Hart 1930) – Arctic Alaska to SCB; 18-120m

Alamprops krasheninnikovi (Derzhavin 1926)– NW Pacific to Puget Sound; 0-12 m

Alamprops obfuscatus (Gladfelter 1975) – Tomales Bay; 18m

***Alamprops quadriplicatus** (S. I. Smith 1879) – NW Pacific; Alaska to Oxnard; 0-104m

Alamprops serratus (J. F. L. Hart 1930) – Puget Sound; 20-95m

***Alamprops tomalesi** *Gladfelter 1975 – Tomales Bay to the Santa Barbara Channel; 6-10m

Alamprops triserratus (Gladfelter 1975) – Tomales Bay to Oxnard; 7-16m

Bathylamprops sp F (MBC 1985)§ - off Pt. Arguello to Tanner Basin; 954-1150+m

***Hemilamprops californicus** Zimmer 1936 – Japan, Puget Sound to San Diego; 13-177m

Hemilamprops gracilis J. F. L. Hart 1930 - Alaska to Puget Sound; 120-200m
***Hemilamprops sp A** MBC 1985§ - Oregon to Pt. Loma; 305-798m
***Hemilamprops sp B** Paquette 1985§ - Oregon to Pt. Loma; 185-732m
Lamprops augustinensis Gerken 2005 see Alamprops augustinensis
Lamprops beringi Calman 1912 – Arctic Alaska to Puget Sound; 0-129m
Lamprops carinatus J. F. L. Hart 1930 -see Alamprops carinatus
Lamprops fuscatus G. O. Sars 1865 – No. Atlantic; SE Alaska to Puget Sound; 2-121
Lamprops krasheninnikovi Derzhavin 1926 – see Alamprops krasheninnikovi
Lamprops obfuscatus (Gladfelter 1975) – see Alamprops obfuscatus
*Lamprops quadriplicatus S. I. Smith 1879 – see Alamprops quadriplicatus
Lamprops serratus J. F. L. Hart 1930 – see Alamprops serratus
*Lamprops tomalesi Gladfelter 1975 – see Alamprops tomalesi
Lamprops triserratus (Gladfelter 1975) – see Alamprops triserratus
*Lamprops sp D MBC 1985§ – see Phallolamprops californiensis
Lamprops sp E MBC 1985§ - off Pt. Arguello; 951m
Lamprops sp F - see Bathylamprops sp F
***Mesolamprops bispinosus** Given 1964 – Pt. Conception to San Diego; 30-100m
Mesolamprops dillonensis Gladfelter 1975 – Tomales Bay; 13-21m
Paralamprops sp BAP1 Cadien 2001§ - Baja Abyssal Plain; 3880-3950m
Phallolamprops californiensis Gerken 2018 – SCB – 20-157m

Key to the NEP Lampropidae (modified from Jones 1969) – dbcadien 6 November 2006

1a. Males with pleopods.....2
1b. Males lacking pleopods.....*Lamprops*+ (see key to genus)
2a. Male with two pleopods.....*Mesolamprops* 3
2b. Male with three pleopods.....4
3a. Uropodal exopod shorter than endopod; telson with two pairs of lateral setae or spines; carapace lacking incised sulcus around ocular lobe and pseudorostrum, smooth.....*Mesolamprops bispinosus*
3b. Uropodal exopod as long as endopod; telson with 3-6 (usually 4-5) pairs of setae or spines laterally; carapace with incised sulcus around ocular lobe and pseudo-rostrum as in *Hemilamprops californicus*.....*Mesolamprops dillonensis*
4a. Basal article of uropodal exopod subequal to or longer than distal article; basis of third maxilliped distally widened .....*Hemilamprops* 5
4b. Basal article of uropodal exopod much shorter than distal article; basis of third maxilliped not distally widened.....*Paralamprops* sp. BAP1
5a. Carapace with incised sinus enclosing pseudorostrum and eyelobe extending ½ carapace length then curving to dorsal midline.....*Hemilamprops californicus*
5b. Carapace lacking incised sinus, but with other carapace sculpture.....6
6a. Carapace with serrate mid-dorsal crest on anterior ½.....*Hemilamprops* sp A
6b. Carapace lacking mid-dorsal crest.....7
7a. Carapace with a single horizontal carina extending from position of antennal sinus posteriorly which sweeps up to the dorsal midline at the posterior carapace margin telson with three subequal terminal spines, and 4 pairs of lateral telsonic spines or setae.....*Hemilamprops gracilis*
7b. Carapace with series of anastomosing ridges which divide it into several irregular

polygons of various sizes on each side of carapace; telson with three subequal terminal spines, and 2 pairs (♂) or 8-9 pairs (♀) of lateral setae or spines.....
.....*Hemilamprops* sp B

[In the following discussion and tables wherever *Lamprops* is used, *Alamprop*s could be substituted. The same is not true of *Phallolamprops*, as will be discussed under that taxon].

Separating *Lamprops*, *Hemilamprops*, and *Mesolamprops* -If males are present the separation is fairly trivial, with differing numbers of pleopods in the three genera: *Lamprops* with 0, *Hemilamprops* with 3, and *Mesolamprops* with 2. Juvenile males, prior to full development of pleopods, may also prove difficult, but pleopod rudiments should be visible in all but the smallest specimens.

Females are much more difficult. Several recent papers have mentioned additional information separating *Lamprops* from the other two in females as well (Haye and Gerken 2005, Shalla and Bishop 2007). They both suggest females of *Lamprops* species have the basis of P1 longer than the remaining articles; that is, the basis comprises more than 50% of the entire limb.

Our current difficulty in separating *Lamprops* sp D from *Mesolamprops bispinosus* can perhaps be solved using this tool. Since we have not found males of *Lamprops* sp D to date, placement in *Lamprops* remains tentative. Since sex ratio is not particularly skewed in other *Lamprops* and in either *Hemilamprops* or *Mesolamprops*, the absence of males in *Lamprops* sp D is troubling. Comparison of the voucher sheet with females of *Mesolamprops bispinosus* yielded few differences other than the fine denticulations on the anterior carapace margin pointed out by Jim Roney. If the females attributed to *Lamprops* sp D do not have the elongate P1 basis characteristic of the genus, I suggest they are the same as *M. bispinosus*.

Comparisons of the type species of the three genera are required to validate the existence of the female character of P1. These are:

Hemilamprops – *H. roseus* (Norman 1864) by subsequent designation
Lamprops – *L. fasciatus* Sars 1863 by monotypy
Mesolamprops – *M. bispinosus* Given 1964 by monotypy and OD

This comparison suggests that the basis/limb ratio of P1 is a useful criterion for separation of females of *Lamprops* from females of the other two genera in the types. But variability in this measure in other members of the genera remained to be explored. This exploration is reported in the accompanying table. Fourteen species of *Lamprops*, 16 of *Hemilamprops*, and 6 of *Mesolamprops* were evaluated for the length ratios of the articles of their first pereiopods. This was done by measurement of published illustrations of the taxa by the original authors and subsequent reporters. Measurement of specimens would have been preferable, eliminating one source of potential error, but would have required unacceptable delay in comparison. The values reported in the table are dimensionless, being based on reproduced illustrations of varying size with no attempt to standardize by manipulation of measurements. Consequently ratios can only be determined within individual species. Absolute values cannot be compared for a single article between species, or even sexes of the same species. As can be seen from the table, it is not just the length of the basis that is important, but also the relative lengths of the propod and dactylus. These two articles are generally more elongate (sometimes by 3 or 4 times) when the bais/limb ratio is low.

In a number of cases data could be obtained for both males and females of a given species. Since Sars (1900) did not specify the sex of the illustrated pereiopods, it was

useful to compare the degree of intraspecific variability in basis/limb ratio with that between species In all three genera males and females of a given species were usually within 10% of each other with regard to basis/limb ratio. Since we will be applying this measure only to females, it should not particularly matter, except in interpreting early reports with sex not reported. Since these appear to conform to the general trend, we can disregard sex in subsequent discussion.

The only *Lamprops* for which females had a basis/limb ratio less than 50% was *Lamprops tenuis*, a species from the northwest Pacific Arctic. The type species, *Lamprops fasciatus* had a ratio of 53%. All *Hemilamprops* species exhibited ratios well below 50%, some as low as 35%. The type had a ratio of 37% .*Mesolamprops* was a bit more varied, with *M. dillonensis* a clear outlier at a ratio of 71%. The rudimentary nature of the illustrated articles beyond the basis suggests that perhaps this was a regenerated individual. The distal portion of the first pereiopod is not infrequently lost, and the post basal portion of the *M. dillonensis* type may have suffered such damage. Alternatively, the drawing could be inaccurate. Other drawings in the same paper seem to conform to existing trends and look more appropriately proportional, so inaccuracy does not seem likely. Females of *M. japonicus* were also reported to have a basis/limb ratio of 50% by Harada (1959). This same species illustrated by Tzareva (1999) had a ratio of basis/limb length of only 43%, well within expectation. She also reported a male of the species with a ratio of 51%, however, so the ratio for the species is not yet confirmed. In general, however, the rule separating *Lamprops* from the other two genera seems to hold; *Lamprops* females show a ratio of more than 50%, while those of *Hemilamprops* and *Mesolamprops* have ratios of measurably less. That the type of *M. dillonensis* is aberrant (as suggested above) in this regard needs to be further investigated by measurements of more specimens of *M. dillonensis*.

Measurements of Pereiopod one article lengths in various species of Lamprops, Hemilamprops, and Mesolamprops

Species	Source	Basis	Ischium	Merus	Carpus	Propod	Dactyl	Total	B/T ratio	% basis
Lamprops augustinensis (M)	Gerken 2005	51	2	7	9	11	8	88	51/88	58%
Lamprops augustinensis (F)	Gerken 2005	47	2	7	10	10	9	85	47/85	55%
Lamprops fasciatus T (?)	Sars 1900`	49	3	8	9	13	10	92	49/92	53%
Lamprops flava (F)	Harada 1959	29	1	6	9	7	5	57	29/57	51%
Lamprops fuscata (?)	Sars 1900`	51	3	10	14	12	8	98	51/98	52%
Lamprops kensleyi (m)	Haye and Gerken 2005	52	2	10	13	14	12	103	52/103	51%
Lamprops krasheninnikovi (F)	Derzhavin 1926	36	2	6	8	9	8	69	36/69	52%
Lamprops lomakinae (F)	Tzareva and Vassilenko 1993	82	5	9	26	14	11	147	82/147	56%
Lamprops obfuscatus (M)	Gladfelter 1975	46	2	13	20	9	9	99	46/99	46%
Lamprops pseudosarsi (F)	Tzareva and Vassilenko 1993	109	10	16	28	20	13	198	109/198	55%
Lamprops pumilio (F)	Tsareva and Kepel 2001	42	3	8	14	8	8	83	42/83	51%
Lamprops sarsi (F)	Lomakina 1958	34	2	4	8	5	5	58	34/58	59%
Lamprops tenuis (F)	Tzareva and Vassilenko 2006	50	3	10	13	17	17	110	50/110	45%
Lamprops tomalesi (F)	Gladfelter 1975	41	2	7	13	7	6	76	41/76	54%
Lamprops triserratus (F)	Gladfelter 1975	45	4	6	14	9	7	85	45/85	53%
Lamprops sp D (F)	voucher sheet	39	2	9	11	11	10	82	39/82	48%
Hemilamprops assimilis (?)	Sars 1900	58	4	12	18	33	25	150	58/150	39%
Hemilamprops bigibba (F)	Gamo 1975	41	5	9	23	4	16	98	41/98	43%
Hemilamprops californicus (M)	Lee & Lee1998	35	1	8	10	19	12	85	35/85	41%
Hemilamprops californicus (F)	Harada 1959	29	1	7	8	12	10	68	29/68	43%
Hemilamprops cristata (?)	Sars 1900	53	3	12	14	27	32	141	53/141	38%
Hemilamprops diversa (M)	Hale 1946	91	5	15	20	48	44	223	91/223	41%
Hemilamprops diversa (F)	Hale 1946	67	4	15	20	44	39	189	67/189	35%
Hemilamprops gracilis (M)	Hart 1930	30	1	6	7	10	9	63	30/63	48%
Hemilamprops gracilis (F)	Hart 1930 (description est)	30	1	7	7	10	10	65	30/65	46%
Hemilamprops izuana (F)	Harada 1959	27	1	8	9	17	14	76	27/76	36%
Hemilamprops lata (M)	Hale 1946	58	3	13	16	22	16	128	58/128	45%
Hemilamprops lata (F)	Hale 1946	62	3	17	25	23	20	150	62/150	41%
Hemilamprops longiseta (F)	Corbera 2006	41	3	12	35	7	16	114	41/114	36%

Hemilamprops merlini (m)	Mullenhardt-Siegel 2005	54	3	7	22	22	10	118	54/118	46%
Hemilamprops pacificus (F)	Harada 1959	31	1	8	9	14	13	76	31/76	41%
Hemilamprops pellucidus (F)	Day 1978	21	1	4	7	9	8	50	21/50	42%
Hemilamprops pterini (F)	Shalla & Bishop 2007	48	2	13	11	21	18	113	48/113	42%
Hemilamprops roseus T (?)	Sars 1900	55	3	12	19	36	25	150	55/150	37%
Hemilamprops ultimaespei (M)	Mullenhardt-Siegel 2003	43	3	8	10	18	18	96	43/96	45%
Hemilamprops ultimaespei (F)	Mullenhardt-Siegel 2003	34	2	7	9	15	13	80	34/80	43%
Hemilamprops uniplicata (?)	Sars 1900	76	4	19	18	37	44	198	76/198	38%
Mesolamprops bispinosus T (M)	Given 1964	16	2	5	6	9	8	56	26/56	46%
Mesolamprops bispinosus T (F)	Given 1964	35	2	8	8	13	11	77	35/77	46%
Mesolamprops denticulatus (M)	Ledoyer 1983	43	2	12	11	22	19	109	43/109	39%
Mesolamprops dillonensis (M)	Gladfelter 1975	66	1	5	7	7	7	93	66/93	71%
Mesolamprops hartleyi (M)	Shalla & Bishop 2007	70	3	13	16	30	25	157	70/157	45%
Mesolamprops hartleyi (F)	Shalla & Bishop 2007	45	3	13	25	6	19	111	45/111	41%
Mesolamprops japonicus (M)	Tzareva 1999	41	2	5	8	12	11	79	41/79	52%
Mesolamprops japonicus (F)	Tzareva 1999	30	2	9	14	6	8	69	30/69	43%
Mesolamprops japonicus (F)	Harada 1959	44	1	8	10	13	12	88	44/88	50%

Other possible methods used in the past for separation of females of the three genera were discussed by Day (1978). Her comments are very apropos and I quote: " there is a small but usually distinct antennal notch in *Lamprops*; it may be present or absent in *Mesolamprops* and is usually absent in *Hemilamprops*. An eye is present in *Lamprops*, variable in *Mesolamprops* and usually absent from *Hemilamprops*." These characters are summarized in the table below for females only, since presence/absence requires no such sexually based comparison as was needed for the basis ratio character. She concludes her discussion of these differences, as well as the basis ratio with the following: "But it should be stressed that *only* the number of pleopods in the male is genuinely diagnostic."

Discriminitory Characters for Females of Lamprops, Hemilamprops, and Mesolamprops

Species	Source	notch*	eyes@	source
Lamprops augustinensis (F)	Gerken 2005	A	D	F/T
Lamprops beringi (F)	Derzhavin 1926	R	D	F
Lamprops carinatus (F)	Hart 1930	D	R	F
Lamprops fasciatus T (F)	Sars 1900	D	D	F
Lamprops flava (F)	Harada 1959	R	D	F
Lamprops fuscata (F)	Sars 1900	D	D	F
Lamprops kensleyi (F)	Haye and Gerken 2005	R	D	F
Lamprops krasheninnikovi (F)	Derzhavin 1926	R	D	F
Lamprops lomakinae (F)	Tzareva and Vassilenko 1993	R	A	F
Lamprops obfuscatus (F)	Gladfelter 1975	D	A	F
Lamprops profundus (F)	Reyss 1978	A	A	F
Lamprops pseudosarsi (F)	Tzareva and Vassilenko 1993	R	D	F
Lamprops sarsi (F)	Derzhavin 1926	R	D	F
Lamprops serratus (F)	Hart 1930	D	D	F
Lamprops tenuis (F)	Tzareva and Vassilenko 2006	A	R	F/T
Lamprops tomalesi (F)	Gladfelter 1975	R	A	F
Lamprops triserratus (F)	Gladfelter 1975	A	A	F
Hemilamprops assimilis (F)	Sars 1900	A	R	F
Hemilamprops bigibba (F)	Gamo 1975	A	R	F/T
Hemilamprops brenkei (F)	Muhlenhardt-Siegel 2005	A	A	F
Hemilamprops californicus (F)	Zimmer 1936	A	D	F
Hemilamprops californicus (F)	Harada 1959	R	D	F
Hemilamprops californicus (F)	Lee and Lee 1998	A	D	F/T
Hemilamprops cristata (F)	Sars 1900	A	D	F/T
Hemilamprops diversa (F)	Hale 1946	A	D	F
Hemilamprops glabrus (F)	Day 1978	A	A	F
Hemilamprops gracilis (F)	Hart 1930	A	A	F
Hemilamprops izuana (F)	Harada 1959	A	D	T/F
Hemilamprops lata (F)	Hale 1946	A	D	F
Hemilamprops longiseta (F)	Corbera 2006	A	A	F
Hemilamprops merlini (F)	Muhlenhardt-Siegel 2005	A	A	F

Hemilamprops pacificus (F)	Harada 1959	R	D	T/F
Hemilamprops pellucidus (F)	Day 1978	A	A	F
Species	Source	notch*	eyes@	source
Hemilamprops roseus T (F)	Sars 1900	R	D	F
Hemilamprops ultimaespei (F)	Mullenhardt-Siegel 2003	A	A	T/F
Hemilamprops uniplicata (F)	Sars 1900	A	D	F
Mesolamprops abyssalis (F)	Reyss 1978	A	A	F/T
Mesolamprops bacescui (F)	Gamo 1999	A	A	F
Mesolamprops bispinosus T (F)	Given 1964	A	D	F
Mesolamprops denticulatus (F)	Ledoyer 1983	A	A	T
Mesolamprops dillonensis (F)	Gladfelter 1975	R	D	T/F
Mesolamprops hartleyi (F)	Shalla & Bishop 2007	A	A	T
Mesolamprops japonicus (F)	Harada 1959	A	D	F

^ * A=absent, R=slight, D=distinct
^ @ A=absent, R=rudimentary, D=distinct
source is Text or Figure

Sadly, these methods seem not to be reliable. Perhaps there is a statistical difference in the frequency of antennal notch expression or eye condition among genera, but no reliable criterion based on these seems to be possible for separation of females specimens in the three genera.

With the confirmation of the value of the basis/limb ratio in separating female *Lamprops* from others in related genera we can revisit our problem of the day. Is *Lamprops* sp D actually a *Lamprops* based on the female ratio? Fortunately during the original preparation of the voucher sheet P1-P5 were illustrated for the female. It should be noted here that the illustration of P1 does not show a small ischium. This is true of some other species, and generally means that it was there, but considered as just the end of the basis. For the purposes of the present measurement the ischium was taken to extend from the end of the combined segments to the base of the distal-most seta shown for the basis. This seta normally sits at the end of the basis, and was assumed to mark the transition from basis to ischium in this case. Measurements were made from the voucher sheet, and added to Table 1. As can be seen, the ratio would suggest that this species is not actually a *Lamprops*, but rather either a *Hemilamprops* or a *Mesolamprops*. Its basis/limb ratio is 47.6%, below the *Lamprops* threshhold. [This problem has been resolved by Gerken 2018 by placing what was called *Lamprops sp D* above in a different and newly created genus *Phallolamprops*, and describing it as *P. californiensis*.]

Alampropos – Gerken (2018) removed all those taxa previously placed in Lamprops which lack short clasping antennae in the adult male. This is consistent with Sars initial usage. Over the years drifting practice had placed many species in *Lamprops* that differed significantly from the type. The current separation is a step to wards restricting *Lamprops* to species meeting the original criteria of Sars. Most, but not all of the NEP species previously placed in *Lamprops* move to *Alamprops*.

Bathylamprops – A single member of this genus, the provisional *B. sp F* is known from the NEP. The genus is relatively small (8 described species worldwide) found at slope to abyssal depths as shallowly as 346m and as deep as 3800m. While half

the largest species come from the SW Pacific, it also has representatives in the North Atlantic, SW Atlantic (Florida), South Africa, East Africa (Gerken 2018) and the NEP. It can be readily differentiated from all other genera of lampropids in the NEP by the long slender acute rostrum.

Hemilamprops – *Hemilamprops californicus* is very common at shallow shelf depths in the SCB. It can be confused with individuals of *Mesolamprops bispinosus*, particularly in the female. Close attention must be paid to the number and position of the lateral setal pairs on the telson to distinguish females and juvenile males of these two taxa. Adult males can easily be distinguished by the number of pleopods; 2 in *Mesolamprops*, 3 in *Hemilamprops*. The condition of the carapace also differs in the two, with the cephalic shield (termed an incised sulcus in the above key) better developed and more defined in *H. californicus* than in *M. bispinosus*. The two taxa can co-occur, so species identity is specimen dependant, and not based on the identity of the males in the sample. *Hemilamprops gracilis* is known only from boreal seas to the north in the NEP, but could range further south than current reports indicate under La Niña oceanographic conditions.

The two provisional taxa in the genus locally are very different, and only one is known to range into the SCB. *Hemilamprops* sp A was taken several times in B'03 sampling at bathyal depths, and from the L.A. 3 Dump Site off Newport Beach. It was originally taken in Central California as part of the MMS Santa Maria Basin Study, and has since been recorded on the Cascadia Slope off Newport, Oregon. There are similarities to several described species (*taseiana* described from Sagami Bay, Japan; and *normani* from the North Atlantic), but the species is still deemed separable. It is the only member of the genus in the NEP with a serrated dorsal crest.

Hemilamprops sp B was originally noticed in one of the BLM RIP samples from near Anacapa Island reexamined during the MMS Santa Maria Basin Study. A single juvenile male was present at Station 24844 at 185m on the island shelf between Anacapa Island and the mainland. A female of the species was taken at 492m off Pt. Sal in Central California. These remained the sole known representatives of the species until examination of samples from the Cascadia Slope in 2002 revealed the species was quite common at one 732m station (over 260 specimens of juveniles, adult males, and adult females). Sexual dimorphism is relatively strong in this species. Both males and females have the same base arrangement of three longitudinal ridges running obliquely forward on the carapace, but the pattern of anastomosing secondary ridges is very different in the two sexes, and more complex in the female. The telsons also differ markedly. In the female the telson bears 8-9 pairs of lateral setae, while in the male there are only two. The female telson is also somewhat longer relative to the uropodal peduncles than is that of the male.

Lamprops – This was the major genus in the family in the NEP, with 10 described and three provisional members. After Gerken's 2018 revision it had dropped to two described and two provisional members. Most removals were placed in *Alamprops*, although one provisional was described in *Phallolamprops*.The occurrence of two provisional species in the vicinity of Pt. Arguello at nearly 1000 m depth is unusual. Both taxa are known from limited material, however, and additional material may show that they belong in other genera in the family, *Lamprops* being a predominantly shallow shelf genus (*Lamprops sp F* has already been moved to *Bathylamprops)*. The number of

species in the genus in the small area of Tomales Bay suggests that there is much hidden diversity in the NEP fauna, and that lampropids are locally underdescribed. Records of *Lamprops quadriplicatus* and *Lamprops krasheninnikovi* from the NEP may be difficult to unravel. *L. krasheninnikovi* was originally described as a subspecies of *quadriplicatus*, and it is not certain which form is referred to in earlier records of *L. quadriplicatus* from the area. Lomakina (1958) presents the forms as subspecies, providing a table for their separation. Lie (1969) repudiated his earlier reports of *L. quadriplicatus krasheninnikovi* (Lie 1968), citing the observations of Given (1965) on Arctic material which suggested that the forms separated by Derzhavin were no more than variations, and not worthy of subspecific or specific separation. Hart (1987), however, continues to record *L. krasheninnikovi*, and no longer reports *L. quadriplicatus* from the Puget Sound area. McLaughlin et al (2005) do not offer a solution to this dilemma, listing *L. quadriplicata* only from the Atlantic, and not listing *L. krasheninnikovi* at all. In contrast Gerken (2005) expressed the belief that all the forms united under *L. quadriplicata* were probably separate species, as was the *L. quadriplicata longispina* identification of Gamô (1965) from Japan. Until the issue is further resolved, both taxa are presented here as being valid at the species level. They are, however, keyed together below. The provisional form *Lamprops* sp F is known only from females, so cannot be accurately placed in the absence of information on male pleopod count. Since the pseudorostrum is long and acute, and the telson is about equal in length to the urosomal peduncle, this may actually be a member of the genus *Pseudodiastyis* or of *Bathylamprops*. Ultimate placement awaits males, but based on materials presented by Gerken (2018) sp F appears to be a member of *Bathylamprops*.

Key to known NEP members of the genus *Alampropos, Bathylamprops, Phallolamprops,* and *Lamprops,(s.s.)* (all formerly *Lamprops*)
– dbcadien 12 June 2021

1a. Telson armed with terminal spines, but lacking lateral setae or spines.....2
1b. Telson armed with terminal spines and one or more pairs of lateral setae or spines 5
2a. Carapace with dorsal carina or keel for at least ½ length.....3
2b. Carapace lacking dorsal carina or keel.....4
3a. Thoracic somites T1-T3 each with anterior tooth on dorsal midline..... .....*Alamprops triserratus*
3b. Thoracic somites T1-T3 lacking teeth on dorsal midline.....*Alamprops carinatus*
4a. Terminal telsonic spines with middle spine and outer pair subequal in length, intermediate pair only half as long.....*Alamprops obfuscatus*
4b. Terminal telsonic spines with middle spine and inner pair subequal in length, outer pair shorter (about 2/3 length of central 3).....*Alamprops tomalesi*
5a. Telson bearing a single pair of lateral setae.....*Bathylamprops* sp F
5b. Telson with 2 or more pairs of lateral setae.....6
6a. Telson with 5-6 pairs of lateral setae.....*Lamprops beringi*
6b. Telson with 2-4 pairs of lateral setae.....7
7a. Carapace lacking carinae or ridges.....*Phallolamprops californiensis*
7b. Carapace bearing one or more ridges or carinae.....8

8a. Carapace with single horizontal or mid-dorsal carina.....9
8b. Carapace with multiple oblique ridges.....12
9a. Carapace with a single horizontal carina extending from the antennal sinus 2/3 of the distance to the posterior carapace edge.....*Lamprops* sp E
9b. Carapace with a mid-dorsal carina.....10
10a. Median telsonic terminal spine only about ½ length of the other four..... .....*Lamprops fuscatus* (♂)
10b. Median telsonic terminal spine subequal in length to intermediate pair.....11
11a. Median telsonic terminal spine and intermediate pair subequal and about 2/3 the length of outer spine pair.....*Alamprops serratus*
11b. Outer terminal spine pair slightly longer than median three spines..... .....*Lamprops fuscatus* (♀)
12a. Carapace bearing partial ridges between the four major oblique carapace ridges; eyelobe reaching nearly to edge of pseudorostrum.....*Alamprops quadriplicatus* and *Alamprops krasheninnikovi*
12b. Carapace lacking partial ridges between the four major oblique carapace ridges; eyelobe separated by ½ its length from the pseudorostral margin..... .....*Alamprops augustinensis*

Mesolamprops - Băcescu (1988) lists only four species in this genus, two of which occur in the NEP. The bathymetric distribution of these taxa is peculiar. Both of the local species are inner to mid shelf animals, while the Mediterranean *M. denticulatus* is upper bathyal, and *M. abyssalis* from the Tropical West Atlantic is abyssal (Băcescu 1988). Gladfelter (1975) provides a useful character table for the separation of the two local species in the genus, and adds *Hemilamprops californicus*, which can be confused with *M. dillonensis*. There should be little difficulty in applying this table in the SCB, as *M. dillonensis* is not known to occur south of Central California. While the cephalic shield is better expressed in *Hemilamprops californicus* males than in females, it is well-enough marked that separation of *H. californicus* from *M. bispinosus* females can be based on the carapace alone. It is wise, however, to also check the number of lateral setal pairs on the telson, which will also separate the two forms. As mentioned under *Hemilamprops*, the two species can and do occur together, with males of each species found with females of either, or both.

Paralamprops - The characters used in the above key to lampropids are those of the genus, and do not serve to separate *P.* sp BAP1 from others in the genus. Currently only one species in the genus is known from the NEP. The genus is composed of at least 15 species worldwide, distributed primarily in the Atlantic and Antarctic. While the majority of the species are known from bathyal depths, they also occur at abyssal and hadal depths (Băcescu 1988). Most of these taxa are keyed in Day (1978), but the three species of Reyss (1978), and that of Mühlenhardt-Siegel (2005a) are missing as is the local provisional. The local species is, like much of the genus, large. The single known specimen being a mature male over 2 cm long. *Paralamprops* sp BAP1 differs in carapace morphology from all other members of the genus, not fitting either half of couplet one in Day's key. It bears a single pair of dorso-lateral ridges, which are not marginal. It also has a very prominent crest like hump behind the obscure ocular lobe, The dorso-lateral ridges and the post-ocular hump are both rounded. Thoracic somites

T1-T5 all bear flattened lateral alae which are largest on T2. The lobe on T5 is not a flattened alar plate as are those on the preceding segments, but a short lateral swelling of the somite. The telson is nearly as long as the uropodal peduncles; the pre-anal portion very short, and the post-anal portion linear and not tapering.

Phallolamprops – The genus was created by Gerken (2018) to house two species, both of which live in the NEP. *Phallolamprops californiensis*, the type, occurs in the Southn California Bight, while *P. pribilofensis* is from the *Pribilof Islands*, just outside our coverage area 200 miles above the Aleutians in the Bering Sea. She provides a key to separate the two. More difficult is separating the genus from others in the family which occur in the NEP. Females can be distinguished from either *Mesolamprops* of *Hemilamprops* females by having the P1 basis well more than 50% of total length (although only listed as 48% in the above tabel as L. sp D). Separation from females of *Lamprops* (ss) can be based on lenth of basal article of uropodal exopod (< 50% of article 2 in *Lamprops*, well over 50% of article 2 in *Phallolamprops*).

Additional Literature Cited (see Part 1 for Main reference list)

Day, Jennifer. 1978. Southern African Cumacea. Part 3, Families Lampropidae and Ceratocumatidae. *Annals of the South African Museum* 76(3): 137-189.

Gamô, Sigeo. 1965. Cumacean Crustacea from Akkeshi Bay, Hokkaido. *Publications of the Seto Marine Biological Laboratory* 8(3): 187-219.

Gerken, Sarah. 2005. Two new cumaceans (Crustacea: Peracarida) from Cook Inlet, Alaska. *Proceedings of the Biological Society of Washington* 118(4):674-691.

Gerken, S. 2018. The Lampropidae (Crustacea: cumacea) of the World. Zootaxa (4438 (1)): 1-192.

Hart, Josephine F. L. 1987. Order Cumacea. Pp. 325-328 IN: Kozloff, Eugene N. *Marine Invertebrates of the Pacific Northwest*. University of Washington Press, Seattle. 511pp.

Lie, Ulf. 1968. A quantitative study of benthic infauna in Puget Sound, Washington, USA, in 1963-1964. *Fiskeridirektoratets Skrifter, Serie Havundersokelser* 14, no. 5: 229-556

Reyss, Daniel. 1978. Cumacés de profondeur de l'Atlantique nord. Famile des Lampropidae. *Crustaceana* 35(1): 1-21.

SCAMIT Voucher Sheet

Species: *Cumanotus fernaldi* Thompson & Brown 1984 Vol.42 No. 5-6

Group: Family Cumanotidae

Date examined: April 20, 2022 (revised 14OCT2025)

Prepared by: K. Barwick & D. Cadien

Synonyms: *Cumanotus beaumonti* of Turgeon et al. 1988
Cumanotus sp 1 of Behrens & Hermosillo 2005

Material Examined: 1 specimen OCSD Sta. 85; 02DEC2021; 58 m

Description: Filliform cerata in paired lateral rows (~11 rows each side) with 6-8 cerata per row and side. Cerata begin anterior to rhinophores; absent mid-dorsally. Rhinophores surface slightly granulated; joined at base. Foot corners and oral tentacles present. Radular formula: ~20x1.1.1. Oblong jaws without any visible serrations along cutting edge (not shown). Live coloration not known. (See page 2 for illustrations.)

Discussion: Radular tooth prep shows them as dead ringers for what Eliot depicted in 1906 in his description of *Cumanotus beaumonti* (Eliot 1906). Behrens (1992) illustrated the radula but for *Cumanotus fernaldi* Thompson and Brown 1984. When compared with the orginal description in Eliot 1906, the illustration of the whole live animal in Picton 1991 and the dorsal ventral in Thompson and Brown 1984, there are slight differences in numbers of denticles between *C. beaumonti* and *C. fernaldi*, but they are only slight. The two are otherwise sufficiently similar that they were confused by a number of workers until Thompson and Brown finally suggested the separation in 1984 and chose the replacement name C. fernaldi for the NEP animal. Cumanotus, as well as Piseinotecus also have the ceratal rows beginning in front of the rhinophores. In preservation this species resembles *Ziminella japonica* (Volodchenko, 1941) but lacks distinct denticles on the lateral teeth (Korshunova et al. 2017) found in the present specimen.

Habitus: These are specialist predators on Tubularia (now Ectopleura), and the animals bear a striking resemblance to the oral area of those hydroid zooids. Frequently taken from colonies of *Ectopleura crocea* (L. Agassiz 1862) on docks and pilings, but they probably will attack solitary zooids as well. They are very difficult to spot when they are sitting on the end of a hydroid stalk, replacing the hydroid anterior end, which they have devoured. Good mimics until they move. Their presence can be inferred, even when the animals are hidden, by the presence of tight coils of eggs laid by the nudibranch on the prey colony. These are pendent off the hydroids, hanging as free coils in the water column, and are quite distinctive. Although other aeolids may lay tangled skeins of egg string, no other local species forms these perfect tight spirals. Their form seems to be a generic character, as the European species also lays such egg 'springs'. There are drawings of these available in the literature, and adding an illustration of the typical spawn to the sheet might be helpful.

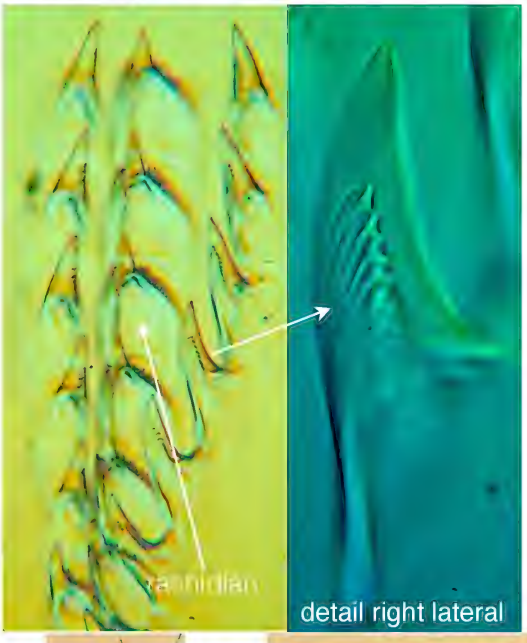
Distribution: Saturna Is., British Columbia to San Diego, California (Behrens 1991)

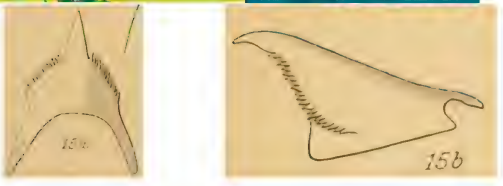
Species: *Cumanotus fernaldi* Thompson & Brown 1984 Vol. 42, No. 5-6

Group: Family Cumanotidae

Date examined: April 20, 2022 (revised 14OCT2025)

Prepared by: K. Barwick & D. Cadien





Line drawings - 15a rachidian tooth,
15b lateral tooth (modified from Eliot 1906)

Date examined: April 20, 2022 (revised 14OCT2025)
Prepared by: K. Barwick & D. Cadien

Literature Cited

Behrens, D. W. (1991). Pacific Coast Nudibranchs, Second Editon. Monterey, California, Sea Challengers.

Behrens, D. W. (1992). Pacific Coast Nudibranchs, Supplement 1 - Radula. Monterey, California, Sea Challengers.

Eliot, C. N. E. (1906). "Notes on some British nudibranchs." Journal of the Marine Biological Association of the United Kingdom 7(3): 333-382.

Korshunova, T., A. Martynov, T. Bakken, J. Evertsen, K. Fletcher, I. W. Mudianta, H. Saito, K. Lundin, M. Schrödl and B. Picton (2017). "Polyphyly of the traditional family Flabellinidae affects a major group of Nudibranchia: aeolidacean taxonomic reassessment with descriptions of several new families, genera, and species (Mollusca, Gastropoda)." ZooKeys 717: 1-139.

Picton, B. E. (1991). "Cumanotus beaumonti (Eliot, 1906), a nudibranch adapted for life in a shallow sandy habitat?" Malacologia 32(2): 219-221.

Thompson, T. E. and G. H. Brown (1984). Biology of Opisthobranch Molluscs, Volume II. London, England, The Ray Society.

RECOMMENDED POLYCHAETE LITERATURE

- **Glossaries and Fauna Lists**
  - Mikkelsen and Virnstien, 1982. ***An Illustrated Glossary of Polychaete Terms***. Harbor Branch Foundation, Inc
  - (Basinger) Maggenti, M. A., Maggenti, A. R., Lyell, S. (Editor). 2005. **Online Dictionary of Invertebrate Zoology: Complete Work.** *Armand R. Maggenti Online Dictionary of Invertebrate Zoology*. Paper 2. http://digitalcommons.unl.edu/onlinedictinvertzoology/2
  - SCAMIT, 2023. **A Taxonomic Listing of Benthic Macro- and Megainvertebrates from Infaunal & Epifaunal Monitoring and Research Programs in the Southern California Bight, Edition 14.**
- **Overview & Higher-level Classifications**
  - Glasby, C. J., Hutchings, P. A., Fauchald, K., Paxton, H., Rouse, G. W., Watson-Russel, C. & Wilson, R. S. 2000. Class Polychaeta. pages 1-296. IN Beesley, P. L., Ross, G. J. B. & Glasby, C. J. ***Polychaetes & Allies: The Southern Synthesis. Fauna of Australia. Volume 4A Polychaeta, Myzostomida, Pogonophora, Echiura, Sipuncula***. Australian Biological Resources Study/CSIRO Publishing, Melbourne, Australia.
  - Rouse, G. W. & Pleijel, F. 2001. ***Polychaetes***. Oxford University Press, New York.
  - ***Handbook of Zoology (Online)*** various editors
- **Keys to Families**
  - Fauchald, 1977. ***The Polychaete Worms Definitions and Keys to the Orders, Families and Genera***. LACMNH and Hancock Foundation. A.K.A. The Pink Book
  - Blake, 1997. ***Chapter 3 Introduction to the Polychaeta, in Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel, Vol. 4 The Annelida Part 1.*** Blake, Hilbig, & Scott., Eds.
  - Bartholomew, A. 2001. ***Polychaete Key for Chesapeake Bay and Coastal Virginia***. Virginia Institute of Marine Science.
    - https://www.vims.edu/research/units/legacy/benthic_ecology/_docs/polychaete_key.pdf
- **Species level monographs**
  - Hartman, 1968. ***Atlas of the Errantiate Polychaetous Annelids form California***. Hancock Foundation.
  - Hartman, 1969. ***Atlas of the Sedentariate Polychaetous Annelids form California***. Hancock Foundation.

- ***Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel, Vol. 4 - The Annelida Part 1. Oligochaeta and Polychaeta: Phyllodocida (Phyllodocida to Parlacydoniiae)***
- ***Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel, Vol. 5 - The Annelida Part 2. Polychaeta: Phyllodocida (Syllidae and Scale-Bearing Fmilies), Amphnomida , and Eunicida.***
- ***Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel, Vol. 6 - The Annelida Part 3. Polychaeta: Orbiniida to Cossuridae***
- ***Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel, Vol. 7 - The Annelida Part 4. Polychaeta: Flabelligeridae to Sternaspidae***
- ***Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel, Vol. 14 – Miscellaneous Taxa***

References – Intro to Annelida – March 2024

- **Aguado, M. T.** 2022. 7.13.12 Antonbruunidae Fauchald, 1977. pages 394-399. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 4: Pleistoannelida, Errantia II*. De Gruyter.
- **Bakken, T., Glasby, C. J., Santos, C. S. G. & Wilson, R. S.** 2022. 7.13.3.3 Nereididae Blainville, 1818. pages 259-307. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 4: Pleistoannelida, Errantia II*. De Gruyter.
- **Bakken, T., Oug, E. & Kongsrud, J. A.** 2014. Occurrence and distribution of *Pseudoscalibregma* and *Scalibregma* (Annelida, Scalibregmatidae) in the deep Nordic Seas, with the description of *Scalibregma hanseni* n. sp. *Zootaxa* 3753(2): 101-117. http://dx.doi.org/10.11646/zootaxa.3753.2.1
- **(Basinger) Maggenti, M. A., Maggenti, A. R., Lyell, S.** (Editor). 2005. Online Dictionary of Invertebrate Zoology: Complete Work. *Armand R. Maggenti Online Dictionary of Invertebrate Zoology*. Paper 2. http://digitalcommons.unl.edu/onlinedictinvertzoology/2
- **Bastida-Zavala, J. R.** 2008. Serpulids (Annelida: Polychaeta) from the Eastern Pacific, including a brief mention of Hawaiian serpulids. *Zootaxa* 1722: 1-61.
- **Batts, R. A., Whitman, K. N., Meißner, K. & Kocot, K. M.** 2022. Biodiversity and Phylogeny of North Atlantic Euphrosinidae (Annelida). *Diversity* 14: 996. https://doi.org/10.3390/d14110996
- **Bick, A.** 2021. 7.4.8 Fabriciidae Rioja, 1923. pages 1-33. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 3: Sedentaria III, Errantia I*. De Gruyter.

- **Blake, J. A.** 1980. The larval development of Polychaeta from the Northern California coast. IV. *Leitoscoloplos pugettensis* and *Scoloplos acmeceps* (Family Orbiniidae). *Ophelia* 19(1): 1-18.
- **Blake, J. A.** 1994. Introduction to the Polychaeta. pages 39-114. IN: Blake, J. A., & Hilbig, B. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 4 - The Annelida Part 1. Oligochaeta and Polychaeta: Phyllodocida (Phyllodocidae to Paralacydoniidae)*. Santa Barbara Museum of Natural History. Santa Barbara.
- **Blake, J. A. & Maciolek, N. J.** 2020. 7.4.3 Trochochaetidae Pettibone, 1963. pages 120-135. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 2: Pleistoannelida, Sedentaria II*. De Gruyter.
- **Blake, J. A. & Petti, M. A. V.** 2019. 5.1 Apistobranchidae Mesnil & Caullery, 1898. pages 133-143. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 1: Annelida Basal groups and Pleistoannelida, Sedentaria I*. De Gruyter. https://doi.org/10.1515/9783110291582
- **Böggemann, M.** 2015. Glyceriformia Fauchald, 1977 (Annelida: "Polychaeta") from Lizard Island, Great Barrier Reef, Australia. *Zootaxa* 4019(1): 70-97. https://dx.doi.org/10.11646/zootaxa.4019.1.7
- **Böggemann, M.** 2022. 7.13.4.1 Glyceridae Grube, 1850. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 4: Pleistoannelida, Errantia II*. De Gruyter.
- **Brantley, C. A.** 2009. A new species of *Poecilochaetus* (Polychaeta: Poecilochaetidae) from coastal waters off Southern California, USA. *Zoosymposia* 2: 81-89.
- **Brusca, R. C. & Brusca, G. J.** 2003. *Invertebrates 2nd Edition*. Sinauer Associates, Inc., Sunderland, Massachusetts. ISBN 0-87893-097-3
- **Budaeva, N.** 2021. 7.12.3 Onuphidae Kinberg, 1865. pages 383-413. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 3: Sedentaria III, Errantia I*. De Gruyter.
- **Capa, M., Bakken, T. & Purschke, G.** 2022. 7.13.14 Sphaerodoridae Malmgren, 1867. pages 413-438. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 4: Pleistoannelida, Errantia II*. De Gruyter.
- **Capa, M., Giangrande, A., Nogueira, J. M. de M. & Tovar-Hernández, M. A.** 2020. 7.4.6 Sabellidae Latreille, 1825. pages 164-212. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 2: Pleistoannelida, Sedentaria II*. De Gruyter.
- **Capa, M. & Hutchings, P.** 2020. 7.4.5 Sabellariidae Johnston, 1865. pages 144-163. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 2: Pleistoannelida, Sedentaria II*. De Gruyter.
- **Capa, M. & Murray, A.** 2015. Integrative taxonomy of *Parasabella* and *Sabellomma* (Sabellidae: Annelida) from Australia: description of new species, indication of cryptic

diversity, and translocation of some species out of their natural distribution range. *Zoological Journal of the Linnean Society* 175:764-811.

- **Capa, M., Parapar, J. & Hutchings, P.** 2019. 4.1 Oweniidae Rioja, 1917. pages 91-112. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 1: Annelida Basal groups and Pleistoannelida, Sedentaria I*. De Gruyter. https://doi.org/10.1515/9783110291582
- **Cerca, J., Meyer, C., Purschke, G. & Struck, T. H.** 2020. Delimination of cryptic species drastically reduces the geographical ranges of marine interstitial ghost-worms (*Stygocapitella*; Annelida, Sedentaria). *Molecular Phylogenetics and Evolution* 143: 106663. https://doi.org/10.1016/j.ympev.2019.106663
- **Chang, C-H., Snyder, B. A. & Szlavecz, K**. 2016. Asian pheretimoid earthworms in North America north of Mexico: An illustrated key to the genera *Amynthas*, *Metaphire*, *Pithemera*, and *Polypheretima* (Clitellata: Megascolecidae). *Zootaxa* 4179(3): 495-529. http://doi.org/10.11646/zootaxa.4179.3.7
- **Darbyshire, T.** 2021. 7.7.5 Arenicolidae Johnston, 1835. pages 163-185. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 3: Sedentaria III, Errantia I*. De Gruyter.
- **Darbyshire, T. & Mackie, A. S. Y.** 2011. Review of Uncispionidae (Annelida: Polychaeta) with the description of a new species of *Uncispio*. *Italian Journal of Zoology* 78(S1): 65-77. http://dx.doi.org/10.1080/11250003.2011.580993
- **Dean, H. & Blake, J. A.** 2019. 7.3.1.4 Ctenodrilidae Kennel, 1882. pages 328-338. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 1: Annelida Basal groups and Pleistoannelida, Sedentaria I*. De Gruyter. https://doi.org/10.1515/9783110291582
- **Di Domenico, M., Worsaae, K. & Purschke, G.** 2021. 7.11.2 Saccocirridae Czerniavsky, 1881. pages 280-298. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 3: Sedentaria III, Errantia I*. De Gruyter.
- **Díaz-Díaz, O., Bone, D. & López, A.** 2013. First Record of Aphroditidae (Annelida, Polychaeta) from Venezuela. *Pan-American Journal of Aquatic Sciences* 8(3): 199-203.
- **Dnestrovskaya, N. Yu. & Jirkov, I. A.** 2011. Identification key for Nephtyidae (Polychaeta) of the Eastern Atlantic and the North Polar Basin. *NMBAQC Workshop 2010*.
- **Ebbe, B. & Purschke, G.** 2021. 7.7.2 Ampharetidae Malmgren, 1866. pages 50-67. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 3: Sedentaria III, Errantia I*. De Gruyter.
- **Eibye-Jacobsen, D.** 2004. A reevaluation of Wiwaxia and the polychaetes of the Burgess Shale. *Lethaia* 37: 317-335.
- **Erséus, C.** 1994. The Oligochaeta. pages 5-38. IN: Blake, J. A. & Hilbig, B. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel 4 – The*

Annelida Part 1 – Oligochaeta and Polychaeta: Phyllodocida (Phyllodocidae to Paralacydoniidae). Santa Barbara Museum of Natural History.

- **Fauchald, K.** 1977. The polychaete worms, definitions and keys to the orders, families and genera. *Natural History Museum of Los Angeles County: Los Angeles, CA (USA), Science Series* 28: 1-188.
- **Fiege, D.** 2019. 7.3.1.8 Sternaspidae Carus, 1863. pages 440-457. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 1: Annelida Basal groups and Pleistoannelida, Sedentaria I*. De Gruyter. https://doi.org/10.1515/9783110291582
- **Glasby, C. J.** 2015. Nereididae (Annelida: Phyllodocida) of Lizard Island, Great Barrier Reef, Australia. *Zootaxa* 4019(1): 207-239.
- **Glasby, C. J., Hutchings, P. A., Fauchald, K., Paxton, H., Rouse, G. W., Watson-Russel, C. & Wilson, R. S. 2000**. Class Polychaeta. pages 1-296. IN Beesley, P. L., Ross, G. J. B. & Glasby, C. J. *Polychaetes & Allies: The Southern Synthesis. Fauna of Australia. Volume 4A Polychaeta, Myzostomida, Pogonophora, Echiura, Sipuncula*. Australian Biological Resources Study/CSIRO Publishing, Melbourne, Australia.
- **Glasby, C. J., Read, G. B., Lee, K. E., Blakemore, R. J., Fraser, P. M., Pinder, A. M., Ersèus, C., Moser, W. E., Burreson, E. M., Govedich, F. R., Davies, R. W. & Dawson, E. W.** 2009. Chapter 17 Phylum Annelida: bristleworms, earthworms, leeches. pages 312-358. IN Gordon, D. P. *New Zealand inventory of biodiversity: 1. Kingdom Animalia: Radiata, Lophotrochozoa, Deuterostomia*. Canterbury University Press, Christchurch.
- **Glasby, C. J. & Timm, T.** 2008. Global diversity of polychaetes (Polychaeta; Annelida) in freshwater. *Hydrobiologia* 595: 107-115.
- **Glasby, C. J., Timm, T., Muir, A. I. & Gil, J.** 2009. Catalogue of non-marine Polychaeta (Annelida) of the World. *Zootaxa* 2070: 1-52.
- **Gonzalez, B. C., Martínez, A., Borda, E., Iliffe, T. M., Eibye-Jacobsen, D. & Worsaae, K.** 2018. Phylogeny and systematics of Aphroditiformia. *Cladistics* 34: 225-259.
- **Goto, R., Monnington, J., Sciberras, M., Hirabayashi, I., & Rouse, G. W.** 2020. Phylogeny of Echiura updated, with a revised taxonomy to reflect their placement in Annelida as sister group to Capitellidae. *Invertebrate Systematics* 34: 101-111. https://doi.org/10.1071/IS19020
- **Grygier, M.** 2000. Class Myzostomida. pages 297-329. IN Beesley, P. L., Ross, G. J. B. & Glasby, C. J. *Polychaetes & Allies: The Southern Synthesis. Fauna of Australia. Volume 4A Polychaeta, Myzostomida, Pogonophora, Echiura, Sipuncula*. Australian Biological Resources Study/CSIRO Publishing, Melbourne, Australia.
- **Haggin, B.** 2023a. *Chaetozone* sp D voucher sheet. *SCAMIT Newsletter* 40(5): 21-25.
- **Haggin, B.** 2023b. *Goniada* sp A voucher sheet. *SCAMIT Newsletter* 40(5): 26-31.

- **Haggin, B.** 2023c. *Syllis* sp A voucher sheet. *SCAMIT Newsletter* 41(1-2): 29-34.
- **Hilbig, B.** 1994. Family Nereididae Johnston, 1845. pages 301-328. IN: Blake, J. A. & Hilbig, B. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel 4 – The Annelida Part 1 – Oligochaeta and Polychaeta: Phyllodocida (Phyllodocidae to Paralacydoniidae)*. Santa Barbara Museum of Natural History.
- **Hourdez, S.** 2022. 7.13.1.4 Polynoidae Kinberg, 1856. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 4: Pleistoannelida, Errantia II*. De Gruyter.
- **Hourdez, S., Osborn, K. J. & Gonzalez, B. C.** 2022. 7.13.1.2 Acoetidae Kinberg, 1856. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 4: Pleistoannelida, Errantia II*. De Gruyter.
- **Hutchings, P., Carrerette, O., Nogueira, J. M. M., Hourdez, S. & Lavesque, N.** 2021. The Terebelliformia-Recent Developments and Future Directions. *Diversity* 13: 60. https://doi.org/10.3390/d13020060
- **Jollivet, D. & Hourdez, S.** 2021. 7.7.4 Alvinellidae Desbruyères & Laubier, 1986. pages 145-162. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 3: Sedentaria III, Errantia I*. De Gruyter.
- **Kupriyanova, E. K., Rzhavsky, A. V. & ten Hove, H. A.** 2020. 7.4.7 Serpulidae Rafinesque, 1815. pages 213-275. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 2: Pleistoannelida, Sedentaria II*. De Gruyter.
- **Lovell, L.** 1990. *Arcteobia* cf *anticostiensis* Voucher Sheet. *SCAMIT Handout*.
- **Mackie, A. S. Y.** 2019. 7.2.1 Aberrantidae Wolf, 1987. pages 269-273. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 1: Annelida Basal groups and Pleistoannelida, Sedentaria I*. De Gruyter. https://doi.org/10.1515/9783110291582
- **Martin, D., Aguado, M. T., Alamo, M-A. F., Britayev, T. A., Böggemann, M., Capa, M., Faulwetter, S., Fukuda, M. V., Helm, C., Petti, M. A. V., Ravara, A. & Teixeira, M. A. L.** 2021. On the Diversity of Phyllodocida (Annelida: Errantia), with a Focus on Glyceridae, Goniadidae, Nephtyidae, Polynodiae, Sphaerodoridae, Syllidae, and the Holoplanktonic Families. *Diversity* 13: 131. https://doi.org/10.3390/d13030131
- **Martínez, A., Di Domenico, M., Rouse, G. W. & Worsaae, K.** 2014. Phylogeny and systematics of Protodrilidae (Annelida) inferred with total evidence analyses. *Cladistics* 1-27.
- **Martínez, A., Worsaae, K. & Núñez, J.** 2019. 7.3.1.7 Acrocirridae Banse, 1968. pages 422-439. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 1: Annelida Basal groups and Pleistoannelida, Sedentaria I*. De Gruyter. https://doi.org/10.1515/9783110291582

- **McCowin, M. F. & Rouse, G. W.** 2018. A new *Lamellibrachia* species and confirmed range extension for *Lamellibrachia barhami* (Siboglinidae, Annelida) from Costa Rica methane seeps. *Zootaxa* 4504(1): 1-22. https://doi.org/10.11646/Zootaxa.4504.1.1
- **Mortimer, K.** 2019. 4.2 Magelonidae Cunningham & Ramage, 1888. pages 112-133. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 1: Annelida Basal groups and Pleistoannelida, Sedentaria I*. De Gruyter. https://doi.org/10.1515/9783110291582
- **Oug, E., Borisova, P. & Budaeva, N.** 2022. 7.12.6 Lumbrineridae Schmarda, 1861. pages 1-35. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 4: Pleistoannelida, Errantia II*. De Gruyter.
- **Parapar, J., Aguirrezabalaga, F. & Moreira, J.** 2014. First record of Longosomatidae (Annelida: Polychaeta) from Iceland with a worldwide review of diagnostic characters of the family. *Journal of Natural History* DOI: 10.1080/00222933.2013.859316.
- **Parapar, J., Capa, M., Nygren, A. & Moreira, J.** 2020. To name but a few: descriptions of five new species of *Terebellides* (Annelida, Trichobranchidae) from the North East Atlantic. *ZooKeys* 992: 1-58. https://doi.org/10.3897/zookeys.992.55977
- **Parapar, J. & Moreira, J.** 2015. Six new species of the genus *Armandia* Filippi, 1861 (Polychaeta, Opheliidae) from Lizard Island (Great Barrier Reef, Australia). *Zootaxa* 4019(1): 577-603. http://dx.doi.org/10.11646/zootaxa.4019.1.19
- **Parry, L. A., Eriksson, M. E. & Vinther, J.** 2019. 3 The Annelid Fossil Record. pages 69-90.IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 1: Annelida Basal groups and Pleistoannelida, Sedentaria I*. De Gruyter. https://doi.org/10.1515/9783110291582
- **Pleijel, F., Aguado, M. T. & Rouse, G. W.** 2012. New and lesser known species of Chrysopetalidae, Phyllodocidae and Syllidae from south California (Phyllodocida, Aciculata, Annelida). *Zootaxa* 3506: 1-25.
- **Radashevsky, V. I.** 2022. Three new species of shell-boring *Dipolydora* (Annelida: Spionidae: Polydorini) from the South China Sea and the Gulf of Thailand, Vietnam, with comments on the modified spines in posterior notopodia and sperm morphology in polydorins. *Zootaxa* 5162(2): 101-119. https://doi.org/10.11646/Zootaxa.5162.2.1
- **Ravara, A., Rizzo, A. E. & Lana, P.** 2022. 7.13.8 Nephtyidae Grube, 1850. pages 380-393. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 4: Pleistoannelida, Errantia II*. De Gruyter.
- **Read, G. B.** 2019. 1 A History of Annelida Research. pages 3-36. IN: Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 1: Annelida Basal groups and Pleistoannelida, Sedentaria I*. De Gruyter. https://doi.org/10.1515/9783110291582

- **Rizzo, A. E. & Magalhães, W. F.** 2022a. 7.13.6 Lacydoniidae Bergström, 1914. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 4: Pleistoannelida, Errantia II*. De Gruyter.
- **Rizzo, A. E. & Magalhães, W. F.** 2022b. 7.13.7 Paralacydoniidae Pettibone, 1963. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 4: Pleistoannelida, Errantia II*. De Gruyter.
- **Rizzo, A. & Salazar-Vallejo, S. I.** 2020. A new species of *Travisia* (Annelida, Travisiidae) from Campos Basin, Brazil. *Studies on Neotropical Fauna and Environment* DOI: 10.1080/01650521.2020.1752512. https://doi.org/10.1080/01650521.2020.1752512
- **Rouse, G. W. & Pleijel, F.** 2001. *Polychaetes*. Oxford University Press, New York.
- **Rouse, G. W. & Pleijel, F.** 2007. Annelida. *Zootaxa* 1668: 245-264.
- **Salazar-Vallejo, S. I.** 2019. 7.3.1.6 Flabelligeridae Saint-Joseph, 1894. pages 398-421. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 1: Annelida Basal groups and Pleistoannelida, Sedentaria I*. De Gruyter. https://doi.org/10.1515/9783110291582
- **Schulze, A., Boyle, M. J. & Kawauchi, G. Y.** 2019. 6.1 Sipuncula. pages 177-200. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 1: Annelida Basal groups and Pleistoannelida, Sedentaria I*. De Gruyter. https://doi.org/10.1515/9783110291582
- **Steiner, T. M.** 2022. 7.12.7 Oenonidae Kinberg, 1865. pages 35-64. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 4: Pleistoannelida, Errantia II*. De Gruyter.
- **Struck, T. H.** 2019. 2 Phylogeny. pages 37-68. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 1: Annelida Basal groups and Pleistoannelida, Sedentaria I*. De Gruyter. https://doi.org/10.1515/9783110291582
- **Tilic, E., Geratz, A., Rouse, G. W. & Bartolomaeus, T.** 2021. Notopodial "spinning glands" of *Sthenelanella* (Annelida: Sigalionidae) are modified chaetal sacs. *Invertebrate Biology* 00:e12334. https://doi.org/10.1111/ivb.12334
- **Tilic, E., Stiller, J., Campos, E., Pleijel, F. & Rouse, G. W.** 2022. Phylogenomics resolves ambiguous relationships within Aciculata (Errantia, Annelida). *Molecular Phylogenetics and Evolution* 166: 107339. https://doi.org/10.1016/j.ympev.2021.107339
- **Tustison, C. A., Ramey-Balci, P. A. & Rouse, G. W.** 2020. More Knot Worms: Four New *Polygordius* (Annelida) Species from the Pacific and Caribbean. *Diversity* 12(4): 146. https://doi.org/10.3390/d12040146
- **Watson, C.** 2022. 7.13.3.1 Chrysopetalidae Ehlers, 1864. pages 228-258. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 4: Pleistoannelida, Errantia II*. De Gruyter.

- **Wellman, C. H.** 2010. The invasion of the land by plants: when and where? *New Phytologist* 188: 306-309.
- **Wiklund, H., Purschke, G. & Ravara, A.** 2021. 7.12.2 Dorvilleidae Chamberlin, 1919. pages 361-382. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 3: Sedentaria III, Errantia I.* De Gruyter.
- **Yáñez-Rivera, B. & Salazar-Vallejo, S. I.** 2022. Revision of *Chloeia* Savigny *in* Lamarck, 1818 from tropical American seas (Annelida, Amphinomidae). *Zootaxa* 5128(4): 503-537. https://doi.org/10.11646/zootaxa.5128.4.3
- **Zanol, J. & Budaeva, N.** 2021. 7.12.4 Eunicidae. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 3: Sedentaria III, Errantia I.* De Gruyter.
- **Zanol, J., Carrera-Parra, L. F., Steiner, T. M., Amaral, A. C. Z., Wiklund, H., Ravara, A. & Budaeva, N.** 2021. The Current State of Eunicida (Annelida) Systematics and Biodiversity. *Diversity* 13: 74. https://doi.org/10.3390/d13020074
- **Zhadan, A. E. & Salazar-Vallejo, S. I.** 2019. 7.3.1.3 Fauveliopsidae Hartman, 1971. pages 317-328. IN Purschke, G., Böggemann, M. & Westheide, W. *Handbook of Zoology. Annelida. Volume 1: Annelida Basal groups and Pleistoannelida, Sedentaria I*. De Gruyter. https://doi.org/10.1515/9783110291582
- **Zhang, J., Hutchings, P. & Qiu, J-W.** 2022. Pectinariidae (Annelida, Polychaeta) from the coastal waters of China, with description of new species and new records. *Zootaxa* 5151(1): 1-74. https://doi.org/10.11646/zootaxa.5151.1.1